Claremont Colleges
Fifth Annual Reading Conference
Summer Session 1940

Sponsored jointly by Alpha Iota Chapter
of Pi Lambda Theta and Claremont Colleges

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PREFACE

In presenting this yearbook of papers pertaining to reading we are pleased to call your attention to the continued development of the broad conception of the nature of reading which has characterized our conferences for the past several years. The conception of reading as developed by most students of the process appears to restrict it very largely to responses to one type of stimulation, viz.: printed word symbols. Throughout a period of years at Claremont Colleges instruction and conferences have attempted to present a somewhat broader definition of the nature of the reading process. We have thought that the definition of the reading process should indicate the characteristics of the behavior rather than merely to specify a form of stimulus which may initiate a reading act. Consequently, we have defined reading as the process of making discriminative responses.

The definition infers stimulation but does not specify any particular form of stimulation. The important aspect of reading behavior is its quality of purposeful adaptation. The responses are directed to be fitting with regard to the nature of the stimulus. This is true whether the stimulus be printed word symbols, spoken word symbols, word symbols presented by gestures, codes, etc., or a situation which does not involve word symbols at all or perhaps involves them merely as a part of the stimulus pattern.

This conception of the reading process makes of it a common thread or core experience which permeates all conscious behavior and which gives character and form to all specialized learning. Learning to read is therefore a fundamental phase of all education and learning how to read effectively specialized forms of stimuli constitutes the task of the student in every area of his concern. If the student is to experience pictures, he must learn how to read them. If he is to experience objects, those must likewise be read. Developing ability to read effectively is therefore the heart of the problem of education.

The conference concerning reading held in 1940 amplified this idea in many respects. The "dramatic panel" which was presented by a cast of students from the seminar in reading problems re-expresses and illustrates the broad conception presented as the theme of this conference series. Reading is identified and described as "a mode of living".

Mrs. Addison illustrates the idea of reading as a language art. She points out that the teaching of reading as commonly conceived by elementary and secondary teachers "is actually the development of a language power". She gives six criteria which indicate that reading, when efficiently performed, is an art rather than merely a craft or technique.

More and more teachers are being made to consider meanings as the basis of communication. Four papers of the conference dealt specifically with that problem as it is being considered by semaciologists and others. Dr. Douglas Campbell presented a discussion of general semantics and

psychotherapy. Perhaps the most important object for reading is that of persons and personal behavior. Language is a form of human behavior which has great potentiality for individual benefit or harm. There are grave psychological problems involved with the use of symbolic procedures. These are aspects of the semantic problem.

Dr. Caster and Dr. Scarbrough presented further discussions of semantic aspects of the reading process. Caster states, "reading may be described as a series of reactions to sign stimuli which serve as cues for mental and emotional activity as the result of verbal conditioning". He offers a statement of seven implications for reading based upon the primary assumptions of scientific empiricism. These are exceedingly pertinent for educators.

Dr. Scarbrough indicated that there are some very fundamental factors which the psychology of reading and indeed which education theory in general has given too little consideration. He pointed out that investigations of the reading process have been largely concerned with "peripheral factors", rather than the fundamental nature of comprehension. General Semantics begins its contribution then where the customary psychology of reading leaves off. General Semantics is not satisfied with mere ability to relate words but is concerned with ability to, "break out of this verbal ring and relate the symbols he is using to the external non-verbal world". "Extensional" and "intensional" meaning were discussed. The presentation strikes at the very heart of the problems of intelligent reading.

Mrs. Wilder showed that reading in the broadest sense of the process is of major importance in bringing about vocational adjustment. She stated that "language predicaments have something to do with vocational problems...". Her paper is constructed around three general points, viz.: (1) the methods of modern science, (2) the application of language to facts, and (3) the lessening of fears which are so prevalent in vocational relationships as well as in life in general. She suggests that as we learn better to cope with "language predicaments" "sanity may be introduced into human affairs." This is an important problem for reading instruction as we enter a program for intensification of industrial production.

The fact that differing types of stimulus patterns require somewhat different forms of the reading process was illustrated by several speakers. Reading the art language, reading science materials, reading motion pictures and reading propaganda were the subjects of special papers by competent students of the respective fields. These papers may well form the basis for faculty discussion to bring out the idea that requirements vary so widely that each field most probably must expect to teach its students how to read the materials of that field.

The problems of writing for and of reading to children were likewise presented. It is no small task to present a communication in such manner that it can and will be properly comprehended by the audience. Attempting to do so requires of the communicant a power to read the audience

efficiently as well as to read to the audience.

Mrs. Montgomery presents a discussion of the problems involved in developing a textbook for reading. Miss Harris gives a practical and stimulating treatment to the problem of reading to children.

Much of the attention given to the reading process by educators has been directed toward remedial work for those who show a deficiency with reading printed word symbols. Papers by Miss Kueneman, Mr. Parks, and Mr. Walker pertained to that phase of the reading field. Mr. Parks presents a "classroom approach to reading difficulty". He questions the value of pressure for merely increasing speed of reading of printed word symbols. He suggests that both speed and comprehension are qualities which "spring from a single source or rather a related group of sources". Miss Kueneman describes a program in support of the thesis that more can and should be done for the older children who do not read printed word symbols efficiently. The major portion of her paper is devoted to "some remedial techniques" which will be helpful to persons who are faced with the problem. Mr. Walker points out that considerable of attention has been given to calculating the cost of repeaters but that little attention has been given to the problem of keeping a pupil "up with his grade". Administrative duties should be directed to reducing that cost and the attendant loss to the students. A ten point program is presented.

The Claremont Conferences have been somewhat unique among the conferences considering reading problems. This is due to the breadth of the conception as to the nature of the reading process which leads to the inclusion of many topics and phases of reading not commonly considered elsewhere. For example, six papers in 1940 were devoted to consideration of physiological conditions which affect efficient discrimination. Dr. Wilcox presented a general discussion of physiological impediments to learning. Nutrition and endocrine aspects of the problem were presented by Mr. Walsh and Dr. Tager respectively. Dr. Robbins reported on a proposed visual testing policy as developed by the Los Angelss County Ophthalmologists. His paper contains many statements pertaining to the relation of vision to reading. Dr. Dalton summarized the results of a survey of visual conditions in a California school system, and Dr. Peters gave a discussion of visual aspects of reading. He recently conducted an experiment in visual training to determine what effect such training might have on developing better ability to read printed word symbols.

The conference sessions varied from theoretical discussions to considerations of specific practices and techniques for special types of reading. The various authors indicate that a broad conception of the nature of the reading process is receiving general acceptance and that ideas and methods of implementation are being altered correspondingly. The papers show that much pertinent information pertaining to educational methods and materials may be secured by tapping non-educational sources. They are reproduced herewith for the reader's use. We hope that you will find them as helpful and stimulating as they have been to us. We express our sincere gratitude and appreciation to the authors who so generously and capably made the conference and yearbook possible.

READING AS A LANGUAGE ART
An exercise in definition

Mrs. Gertrud Addison, Staff Member in Charge of Language Arts Curriculum
Los Angeles City Secondary Schools

When I was invited to write on the topic, Reading as a Language Art, I blinked my eyes in momentary surprise at the idea that reading should ever be considered anything but a language art. In fact I was quite disconcerted until I recalled that Claremont where I was to read my paper is the home of that broadly scientific concept of reading which reaches out and incorporates all intelligent observation --indeed all discriminating perception. So I was driven to that most delightful of researches, the definition of terms long taken for granted.

"To read is to peruse" says my dictionary. I am accustomed to peruse chiefly books; occasionally, however, other things such as files, records, bibliographies, and such. Somehow with this synonym I find it difficult to escape the association of written or printed matter. I peruse a picture book, to be sure, but I read a thermometer, a graph, or a diagram. The two words don't shuttle back and forth as a pair of synonyms should. I'd better experiment further .....

The other morning, in the cool of the near-dawn, I went into my garden. I perused the edges of my zinnia bed where I had sprinkled poisoned bait the night before. What I read there filled me with a cruel glee. It was a story of loathesome creatures prowling at dusk, horns lifted and base appetites astir! I read the shining, circling path of silver along which the marauders had glided toward their death. I read the lure of sweetened bran and the devastating reaction produced by metaldehyde. And in the horrid, slimy corpus delicti I read the tale of writhings and slow agony. In empty shells I read the final dessication, the ultimate nothingness. Beyond the rim of death, my young zinnias stood straight and clean, unbitten and unchewed. I could read in their fine vigor-- aided of course by my recollection of the glamorous pictures in the seed catalog -- a future for one corner of my garden. And I could even read myself into the story bringing armfuls of bright color into the house, arranging bowl after bowl of flowers, more than enough for the whole neighborhood. I could even read a bit of dialogue -- someone saying, "Well, we licked the snails, didn't we?" and someone else muttering, "Yeah, but damn the grasshoppers!"

Well -- I read all that in my garden Monday morning. One might think I had read enough for one day. But my housewifely impulse ran hand in hand with my love of reading and gave me another rich experience. Any morning it's a good idea to take a quick look into Jack's room to see whether he has remembered to make his bed. That morning he hadn't, of course. So I barged determinedly in and began to tidy up the room, reading as I tidied. Sand in his bed-- he didn't bathe after returning from the beach yesterday! Olive oil bottle uncorked on the table. Aha! Touched by the sun and not wanting to peel. Electric razor loose and uncleaned on the chiffonier- Obviously he is well-groomed this morning though the razor isn't,

That horrible Kewpie Doll! Well -- it seems the boys spent part of the time yesterday on the amusement pier, and Jack still has a good eye at the shooting gallery.

"Hi, Mom, what do you think you're doing in my room? I'll make my bed! "

"Only reading, dear. I'll be through in a jiffy -- as soon as I read this last chapter on the floor of your wardrobe. I have just read about the wrestling match on the beach, and I must find out whether your other shorts are torn as badly as this pair is". Truly, reading maketh a full man.

When my thinking had moved thus far -- still working at definition -- I had almost convinced myself that reading words and other symbols is only a small part of it. Furthermore, I was quite sure that perusal is not a satisfactory synonym for reading, Webster to the contrary notwithstanding.

As my mind cleared, however, I knew that even in the garden and in Jack's bedroom, I had been using language in my thinking. When my perusal passed over into reading, I had begun to think, and as soon as my thinking began, I was using language to think with. The names of the things I saw, the names of the things I knew had happened, words for the qualities of all these things -- all were formed in my mind. As soon as discrimination overtook mere perception, a gritty sensation at my fingertips as I smoothed the sheet became sand, a clearly-named substance. The feeling of loathing produced by the snail, dead or alive, almost immediately became articulate in mental language, and my mind was using nasty words like horns and prowling and slime and writhings.

But here I struck another snag. I knew very well how dangerous it always is to generalize from one's own introspection. Many of the people that I know, certainly many of the pupils whom I have tried to teach, seem far less dependent upon language than I am. When I was reading a book recently, I met one such person. In fact I was re-reading the book -- but when I read it first many years ago, I missed a lot of it. Do you remember Tom Tulliver in The Mill on the Floss? Tom, unlike his sister Maggie, was very stupid about book learning; but he was far cleverer about some other things. He was the despair of his tutor, the Reverend Mr. Stelling, who tried vainly to call forth an interest in Latin verbs and the classics of literature. But --

> "Tom never found any difficulty in discerning a pointer from a setter, once he had been told the distinction. He could predict with accuracy what number of horses were cantering behind him. He could throw a stone right into the center of a given ripple, he could guess to a fraction how many lengths of his stick it would take to reach across the playground and could draw almost perfect squares on his slate without any measurement".

Surely some of this was reading -- and remarkably clever reading, too.

Now one difference between Tom Tulliver and his tutor (and Dr. Stelling may stand in this discussion for all of us teacher folk)-- one difference lay in the lesser degree to which Tom's mind tended to verbalize his experiences. This reading of Tom's was hardly a language process at all -- it was an art of well-coordinated eyes and ears and muscles. The names pointer and setter were doubtless quite unimportant to him. The dog that does this for the hunter and looks like this -- he is different from the dog who does that and looks like that.

Tom probably made his distinctions with pictures in his mind and with a good understanding of a dog's behavior and functions. His thinking had no need for words like rigid and point and smooth-haired -- set and crouch and shaggy. The Reverend Mr. Stelling might work forever with Tom Tulliver and never succeed in making a linguist of him. Indeed Tom might never learn to use words for thinking to any great extent -- and he might get along very well in his trade and in his family without them. Reading in books would never occupy much of his time, and possibly Father Tulliver might better have saved his money and Dr. Stelling have spared his pains.

This brings us to the clear recognition that what we call the teaching of reading in both elementary and secondary schools is actually the development of a language power. It is part of our American cultural pattern to believe that thinking done with the full aid of language is likely to be sharper, more reliable, capable of finer discrimination and more valid synthesis. We value every opportunity or device to strengthen the ability of our citizens to think their way through problems and to safeguard their thinking from influences that distort and mislead. Therefore, the teaching of reading has ever been of great importance in the curriculum of the American school.

By this time I hope I have made clear the relationship that exists between reading and language and between language and thinking. As far as the schools and the responsibilities of school teachers are concerned, reading is merely one way of using language for thinking. Rightly or wrongly, the more rudimentary forms of reading -- the forms in which our Tom Tullivers excel -- concern the schools very little. We have the more difficult responsibility of teaching people how to interpret an intricate system of symbols, how to think with these symbols and at the same time to avoid falling into the debilitating vice of over-verbalization. As we help our pupils to use the language skills involved in reading, we must bear in mind the constant necessity of relating language symbols to the realities for which they stand. So we shall avoid purely mechanical achievement and manage to keep the use of language in close touch with the specific factors of experience which language represents.

There are many people in the world like Tom Tulliver. For them reading may never become a language art. Reading, when taken out of the

operational reality of eye-ear-muscle experience and into the area of verbal symbolism, becomes a laborious and unnatural process. With much help from teachers and much effort on the part of the learner, the reading of written or printed matter may, however, become a useful skill operating in simple situations. The headlines of newspapers, traffic signs and the names of streets, uncomplicated instructions, an occasional letter, names and simple propositions on the ballot -- the literate American must have the skill to read such things. More and more our culture is recognizing, however, that short-cuts to reduce the need of reading are practical and desirable in present-day communication. Non-verbal symbols safeguard our highways -- a red or green light, a wavy line warning of curves ahead, a shrieking siren, a double white line along the middle of a pavement, crossed lines with the double R, and a lively wig-wag at the railway tracks. Our toleration of billboards, our devotion to the pictorial magazines, and our increasing dependence upon the motion picture are all symtomatic of the modern demand for wordless communication. (The tendency would seem atavistic if it were not so streamlined and sophisticated.) "One picture is worth a thousand words" today more than ever before -- and for the same old reason: because so many of our people find the picture closer to the reality which they know how to interpret. And this is because there are so many Tom Tullivers among our school children, among our motorists, among our voters and our consumers, people to whom reading is of necessity no language art, but instead, when it operates through language at all, a difficult but useful skill.

Have you observed that I am making a distinction -- possibly a false and unreasonable one -- between a skill and an art? What is an art? Here again the dictionary presents as synonyms words that must be distinguished from one another. The word <u>skill</u> is quite commonly used in defining art -- but with qualifications. "Skill which is acquired by experience, study, or observation. Skill in the adaptation of things in the natural world to the uses of human life." Giddings is quoted in Webster's New International as follows: "All arts, we must remember, are phases of the social mind. We are so much in the habit of thinking of them in terms of art products that we forget that the arts themselves are groups of ideas and acquisitions of skill that exist only in the minds, muscles, and nerves of living men".

I suppose hundreds of men and women have tried to say what art is. Most of them, as Giddings points out, are pre-occupied with art products. Art as a process has been less clearly defined.

John Dewey, in his volume, <u>Art as Experience</u>, makes the presence of emotion in any expression a criterion of difference between art and mere craftsmanship: ".....emotion must operate. But it works to effect continuity of movement, singleness of effect amid variety. It is selective of material and directive of its order and arrangement. ..... Without emotion there may be craftsmanship but not art; it may be present and intense, but if it is directly manifested the result is also not art."

Hendrik Willem Van Loon in his book, <u>The Arts</u>, written with the

avowed purpose of simplifying and popularizing the story of art through the ages, deplores the tendency to draw a sharp line between art and craftsmanship. To illustrate his point he tells a charming story from the Middle Ages.

"It is a tale about two penitent sinners who approached the image of the Madonna to ask her a favor, but who were conscious of the fact that they had really nothing to offer in return for all her manifold blessings.

"Therefore one of them, a poor musician who had no other possession than his old fiddle, played her his loveliest tune, and behold! his prayer was answered. But when it was the turn of the shoemaker, he felt that his pilgrimage had been in vain, for all he could do was to offer to make the Queen of Heaven a pair of dainty little slippers so that she might go well shod to her next dance, for it was a well-known fact that the angels in Heaven dance whenever they are very happy and that sometimes our good Lady takes part in their festivities. 'But what,' so the cobbler asked himself, 'is a new pair of slippers, compared to that music which I have just heard?'

"Nevertheless, he made her the most beautiful slippers he could and behold! he too found favor in our Lady's eyes, for his golden slippers had been his own particular way of expressing his emotions and, after all, it was the effort that counted much more than the final result".

Mr. Van Loon draws his own moral from this little tale. "Why is it", he asks, "that our modern world insists upon drawing such a very sharp line of demarcation between the arts and the crafts? In the days when the arts were really an integral part of the people's daily lives, that line of demarcation did not exist. Nobody was aware of a difference between the artist and the craftsman. As a matter of fact, the artist (if he were recognized as such) was merely a craftsman of exceptional ability, a stonecutter who could make figures in marble just a little better than any of the other members of the stonecutters' guild. But today the artist lives on one side of the street and the craftsman lives on the other side and the two hardly speak to each other."

Van Loon comes to rebuke us at this point of our discussion. Possibly it is a false demarcation we have been trying to make. Perhaps what we have called skill is merely a lower order of the manifestation which, in higher levels of expression or activity, becomes art. Thomas Craven supports Van Loon when he describes the artist as a "sane, healthy, and industrious workman, differing from his fellows only in the intensity of his endowments."

Now it seems we may be justified in the conclusion that anyone who has taken the first steps in learning to read has begun to develop a language skill. Returning to our basic definitions, we may assume then that as soon as that skill has been modified and developed by experience, study, or observation it begins to approach the level of what may be

called an art. When this skill begins to adapt things in the natural world (substitute the content of a book) to the uses of human life, it wins itself a new name.

George Santayana supports our thinking here. In relating art to instinct, he sees the transition to art taking place when man's action affects objects in his environment with conscious purpose:

" A footprint could fill Robinson Crusoe with emotion, the devastation wroght by an army's march might prove many things to a historian, and even the disorder in which a room is casually left may express very vividly the owner's ways and character.

" Sometimes, however, man's traces are traces of useful action which has so changed natural objects as to make them congenial to his mind. Instead of a footprint we might find an arrow; instead of a disordered room, a well-planted orchard -- things which would not only have betrayed the agent's habits, but would have served and expressed his intent. --- Any operation which thus humanizes and rationalizes objects is called art.

" If the birds in building nests felt the utility of what they do, they would be practicing an art; and for the instinct to be called rational it would even suffice that their traditional purpose and method should become conscious occasionally. Thus weaving is an art, although the weaver may not be at every moment conscious of its purpose, but may be carried along, like any other workman, by the routine of his art; and language is a rational product, not because it always has a use, but because it is sometimes felt to have one".

Santayana epigrammatically says, "Progress is art bettering the conditions of existence." Art, he says, establishes instruments for human life beyond the human body, and moulds outer things into sympathy with inner values, and establishes a ground whence values may continually spring.

As we attempt to guide children along the road toward reading as a language art, we may look at the process in four phases, not sharply separate but supporting and merging into one another.

First there is the phase which may be called establishing a readiness for reading. In this phase, the child is organizing his own physical, intellectual, and emotional equipment, removing or overcoming any physical impediments, extending his experiences, broadening and deepening his interests, developing a desire to read, and making a satisfactory emotional adjustment to his fellows and to the conditions of his life.

The second phase brings the ability to recognize and pronounne word symbols and the far more significant development of meaning-associations for words ahd groups of words. At this stage the good teacher understands

the positive correlation between success in learning to read and the development of accurate experiential concepts in relation to word symbols. She helps the child further to broaden and enrich his experience, with specific reference, now, to the concepts with which his reading is concerned. She finds, however, that some children learn quickly to recognize and pronounce words with a misleading aptness. Words without meaning, or words with only vague unspecified meanings crowd the child's reading vocabulary. Eventually poverty of meaning devitalizes the printed page as far as the child is concerned, and boredom follows. So we have the familiar type of pupil who says impatiently, "Sure I can read it, but it doesn't say anything."

Thus the building of background for pupils continues to be a major responsibility of the teacher. Excursions, pictures and visual aids of all sorts, real-life activities such as constructing models, making gardens, managing school traffic, experimenting with actual materials in simple science laboratories and workshops -- such experiences as these accompanied by discussions and explanations are good background builders. Resources of the home and community, too, may be drawn into the service of the reading program.

Teachers in this phase need to give particular attention to certain types of words -- those whose meanings are conditioned by the context. Grace Storm, speaking at the University of Chicago Conference on Reading last year, illustrated this type of hazard:

> "Such words are : 'peeped', <u>looked in</u>, and 'peeped', <u>a chirping noise</u>; 'fast', <u>quickly</u>, and 'fast', <u>tightly</u>; 'blow', <u>to move the air</u>, and 'blow', <u>a sudden stroke with the hand or a weapon</u>. In connection with the last two words, the following misunderstanding was related by a third-grade teacher. This sentence occurred: 'As the man went through the door, he received a blow on the back'. The discussion of the paragraph brought out the question, 'What happened to the man?' A pupil answered, 'He was blown through the door. '"

This incident furnishes a simple illustration of the context theory of meaning which later we shall discuss more fully.

As we pass along into the third phase, we carry with us strands from the first and second. Good health, freedom from visual or auditory anomalies, satisfactory social and emotional adjustment are still of fundamental importance. The enriching of experience must continue to broaden and deepen the background which gives meaning to an increasing variety of word symbols. Concepts are given sharper outlines and the fascinating possibilities of words as they move through different contexts are explored.

In this phase a high degree of skill may develop. Here we are certainly approaching an <u>art</u> of reading. A pupil may consciously apply effort to the task of lengthening his eye-span, eliminating reversals, and so speeding the process of getting meaning from the printed page. Narratives begin to move swiftly for him. He learns to read expository prose, at

first laboriously and then rapidly and precisely, recognizing not only the units of the author's thought, but the processes as well. Main ideas and supporting details emerge in clear relationship. The framework of organization, if there is one, gives shape and meaning to a fabric of cooperating concepts.

Now let us go on into what I have called the fourth phase in the development of reading ability. Here we find operating skills of such high order that the reader who uses them with full effectiveness is truly a master-craftsman, an artist in his field.

The master-craftsman is able to make full use of context in his reading. And in this connection we are using the term context in its broadest sense. First we are interested in the way words used together affect one another. The interanimation of words, as Richards calls it, is a remarkable characteristic of language. Think of the word social, for example in the following sentences:

a. The class was studying housing as a social problem.

b. The senator attacked the President's social policies as being hostile to individual freedom.

c. The social program under a Republican regime would have features strikingly different from those pursued by the New Deal.

d. Mary was occupied with a thousand little social responsibilities, all of which had come to seem vastly important in the scheme of her life in Bridgetown.

Note how the word social is limited and given meaning by its use in the first sentence with class, studying, housing, and problem. An issue is involved, but the problem is academic.

In the second example, social gets into politics and the words surrounding it not only limit and interpret it, but attacked and hostile charge it with emotion.

In the third sentence there is less emotional stress, perhaps. But the word regime and the conflict suggested by Republican and New Deal make it squirm a little; so this context gives us still a different word.

And how social has lost caste in the sentence about Mary. Thousand and little impair its dignity; the phrase seem vastly important casts doubt on its validity as a qualifier of responsibilities. And in passing note, too, how little counteracts the normally magnifying effect of thousand, how seem takes the stuffing out of vastly important.

The reader who in his stride lets context do its work, does more than merely keep track of changing meanings. He uses broader contexts. One observer may call me a grammarian and I may be grateful for the compliment.

Another using the word could burn me up -- I'd know it for an insult. So, the person who utters a word gives it context, and the writer's background and point of view give context, too. You are familiar with the Westernism, "When you say that, smile! " Some utterances need the context of a smile and a good-natured voice. If such thoughts are written, the context of the writer's personality and point of view are essential to the reader's understanding.

A newspaper writer recently used the phrase, "rich-boy Roosevelt and poor-boy Willkie". Think how much background the reader must have to read those words aright. Well -- the article was in the Los Angeles Times. Believe, me, that gives a context. It was published immediately after the selection of the Republican nominee for the presidency. More context. Poor-boy needs the context not only of a simple Indiana childhood but also of an office in Wall Street and the presidency of Commonwealth and Southern. Rich-boy needs the context not only of Hyde Park millions but of the W.P.A. and the Tennessee Valley Authority.

Countless examples could be given from literature. What filial duty meant to Hamlet, what sin meant to Roger Dimmesdale, what love meant to Madame Bovary -- the contexts needed here comprise the knowledge of a culture, clearly oriented in time and in community. The words interventionist and isolationist are different today from what they were two weeks ago; the words migrant and farmer are different words in the foothills from those same words spoken or written in the San Joaquin valley.

Our master-reader must have wide background and great flexibility to make full use of context in his reading. He must, moreover, be able to estimate an author's design beforehand, to begin his reading with a more or less certain knowledge of what the writer is "getting at". Then he must be alert to signs of the fulfillment or failure or even denial of the intent which seemed indicated at the start. Last evening I heard over the radio a book-reviewer who was pre-occupied with a problem of intent. He was reviewing a book by Dr. Lothrop Stoddard; the title, I believe, was Into the Darkness and the matter was a report of the author's visit to Germany last winter. Dr. Stoddard had studied Germany in war time, had had conferences with Der Fuehrer, with Dr. Goebbels and Herr Himmler. The reviewer reminded prospective readers of the book that it was the publisher, not the author, who had used the words objective, shocking, and honest in the commercial blurb; and the publisher had given the book its suggestive title. He went on to call attention to the great favor with which Stoddard seemed to view the Nazi regime, and the charming fellows he made the leaders out to be. In short, the reviewer accused the publishers, through promotional statement and title, of misrepresenting the intent of the author. What the author really wanted to do was, as the reviewer read it, to win friends for Germany in America. He concluded by saying, "If I were Hitler or Goebbels or Himmler, I should be tremendously pleased to have Into the Darkness circulate widely in America." As unconsciously as the weaver, "carried along like any other workman by the routine of his art", this broadcaster showed one aspect of his own power with books - his ability to anticipate, follow, and evaluate the intent or purpose of what he reads.

This ability is all bound up with the master-reader's expertness in handling propaganda materials. Young consumers in American high schools are learning rapidly how to read advertising with the appropriate and necessary large grain of salt. Courses in consumer education are teaching reading nowadays, introducing pupils to the psychology of advertising, and teaching them to discipline their own reactions. Propaganda in advertising, however, is powerful but relatively simple stuff. It requires a greater skill, perhaps some art, to recognize and evaluate the influences operating in political prose of one sort or another, even when we know surely that the intent is to persuade if not to mislead.

When the design is hidden and the influence subtle in its techniques, our master-reader is put upon his mettle. Then he penetrates the camouflage and sees the true shape of things. He brings full context to bear and misses no shade of meaning or intent. In short, he reads and the propagandist can't fool him.

One reason why the master-reader is comparatively safe from the seductions of the propagandist is his awareness of what, in the theory of Jeremy Bentham, are called verbal fictions. Some children become aware of these early, when the grammar teacher points out -- "This, children, is an abstract noun." Love, safety, justice are things we cannot see or touch or in any way perceive with our senses. Such nouns, the formal grammar teacher says are in a class by themselves, apart from the names of real things like books, or stones or houses. Unfortunately the teacher often stops with the recognition of the two types of words and the classification of nouns as concrete or abstract. That is why we call her type of work formal instruction. Now there is a theory of interpretation that goes further with this matter of abstraction and points out that, because these words cannot be associated with perceivable referents, they are actually fictions, naming unrealities. Love, as a separate entity doesn't exist anywhere in the world, except in terms of the ways certain human beings feel and behave -- and in the results of such feeling or behavior.

I always want to argue that point a little; but with the Benthamites I am soon beyond my depth. At any rate it is easy to see that the vagueness of such words makes them peculiarly liable to misinterpretation. In fact they are used so loosely and so variously that communication through them often fails. In these days both press and air-waves are loaded with such words -- and democracy, intervention, and preparedness are among the most dangerous. Because dictatorship is associated with a particularly odious centralization of economic and political power, the epithet may now be used without scruple to name and to damn other types of governmental centralization, and to damn the political candidate of either the outs or the ins.

Let us consider the fiction justice. What did Portia mean when she spoke to Shylock?

"And earthly power doth then show likest God's
Then mercy seasons justice. Therefore Jew,
Though justice be thy plea, consider this,
That in the course of justice, none of us
Should see salvation."

Were Portia and Shylock thinking of the same thing? To Shylock justice was closely allied with vengeance and punishment-in-kind. To Portia it was a high judicial ideal, which might deal fairly or even mercifully. In Southern California both Associated Farmers and migrant workers cry out for justice -- to the one it means a chance to realize a profit on investment; to the other, life itself -- on a subsistence standard.

The artist reader is a master of the verbal fiction. He knows how to fill it with meaning of his own or of the author's. He knows how to protect himself from its confusions, how to resist its emotional charge.

Fictions make another type of hazard for the reader. They are slippery things and betray almost any writer into confusing shifts of meaning. While I was preparing the earlier part of this paper, I had a fine time keeping track of the word art as it skipped about the pages of philosopher and critic. One moment it was an object or a representation, again it was a skill or a process, and again a vast body of human knowledge or accomplishment. I struggled as I read to keep abreast of these shifts in meaning; then struggled as I wrote, hoping to use the word less shiftily in my discussion of "Reading as a Language Art". The result is that I have to a considerable extent dodged the word art, except where I could lean heavily upon philosopher or critic.

This idea of my "dodging a word" and then "leaning heavily" upon Santayana or Thomas Craven reminds me -- the artist reader is a master of metaphor.

Now metaphor, like the abstraction, is frequently the subject of school-room drill. And this is unfortunate, because this remarkable resource of language, this joy of the master-reader often becomes so tangled in Greek nomenclature and so bogged down in formalism that, for school children, all of its fascination is frustrated, the joy all drained away. The master-reader is keenly aware of the presence of metaphor. For him a well-written page is alive with movement, it carries color and allusion that the more pedestrian reader never knows is there. The response to metaphor is more frequently a resource for appreciation than an intellectual aid. It gives the reader an aesthetic advantage. Plodders get the sense fairly well without it. But with it the master-reader gets the sense more fully, and has more fun. Sometime when you have a moment to speculate about language, examine a page of well-written prose, one that has succeeded in exciting you a little. You may be surprised to discover the extent of metaphorical language in it. Sometime take a moment to note how many common dictionary meanings of words are derived or figurative meanings.

One grace of our modern language is the extension of metaphor into

all kinds of verbal expression. We are aware of the figurative brilliance of much of our modern slang. We can see the interaction of things happening in different arenas. Blitzkrieg may swiftly be taken over into department store advertising -- in a ridiculous sort of way. But it is oddly impressive to have a commentator on European news discount the seriousness of air raids in the theater of war, calling them mere "blows to the body -- not so damaging as rights to the chin."

It is time now to draw together the threads we have been spinning into some sort of pattern. I have persuaded myself at least -- and I hope I have brought some of you along with me -- that it is no misnomer to think of reading as an art. To clinch the argument, let us apply the criteria.

Here is a man or woman, perhaps a very young one, who reads with such a high degree of skill that we are inclined to believe he has mastered a useful language art.

First criterion, from Webster: Has this degree of skill been acquired by experience, study, or observation? Is the reader able to adapt the content of what he reads to the uses of his own life?

Second criterion, from Giddings: Does this skill operate socially? And has it furthermore become literally a function of the reader's mind and nervous system?

Third criterion, from John Dewey: Is the operation of the skill governed by a unifying emotion (not directly manifested) which gives "continuity of movement, singleness of effect amid variety -- selecting material and directing its order and movement?"

Fourth criterion, from Van Loon: Does the user of the skill set and meet a high standard for his workmanship, like the shoemaker who made for the Queen of Heaven the most beautiful slippers he could, or the stonecutter whose figures in marble were just a little better than those of any other craftsman in the stonecutters' guild?

Fifth criterion, from Thomas Craven: Is this reader "a sane, healthy, and industrious workman, differing from his fellows only in the intensity of his endowments?"

Finally -- Santayana: Has our reader learned to incorporate what he reads into his own thinking, making what he reads "congenial to his mind?" Does he work sometimes with conscious purpose, "moulding these outer things (the ideas which he reads) into sympathy with his own inner values, establishing a ground whence new values continually spring?"

If all these things have been added unto him, he is more than a craftsman, he has become a master of reading as a language art.

SCIENCE IN THE CURRICULUM

Maurice R. Ahrens, Denver Public Schools

The contributions of science in developing a way of living cannot be adequately or effectively dealt with unless the relationship of science to the total school curriculum is understood. In the formal educational program today, science represents but one area of experience which purports to aid in the development of integrated personalities. Therefore it cannot be singled out from the total educative process. For this reason, in this discussion, an attempt will not be made to single out science as "God's gift to better living", but rather to show how science has fitted into the total scheme of formal education, and to indicate future possibilities.

Education of the past as well as much of the education of the present has been based upon several well known and well defined assumptions. The most important of these are:

1. That the heritage of the past must be transmitted to the present generation. This assumption is supported on the basis that the present generation is unable to interpret and improve living without a clear understanding of the impact of the past.

This seems to be a most worthy objective for even the most modern approach to education. But let us see what form it has taken in the school curriculum.

Most school curricula today have well organized sequential courses in history. Pupils are given a thorough understanding of the cultures of the past, beginning with pre-historic man and continuing chronologically to the present generation. They delve into political, social, and economic development throughout the ages.

Does such an educational experience help those individuals to interpret and improve living? Can we honestly say that the masses of Americans who have had these courses understand the international situation and see possibilities for solution? Or shall we say that the large mass of our people are in a "fog" and are groping for leadership which will interpret and solve these problems for them?

Conventional courses in science teach the contributions and development of science from the time of Aristotle to the present. Pupils learn of the discovery of the laws of falling bodies by Galileo, how Priestley discovered oxygen, and of the discovery of bacteria by Lister and Pasteur. What has been the value of such facts in the interpretation and improvement of living? Can such learning be justified when 85% of our people are using an antiseptic for minor abrasions which has no value in killing bacteria? Can it be justified when thousands of our people are being killed every year by dangerous drugs, starvation diets, and quack practitioners?

2. The second assumption upon which education is based is that there are certain knowledges and skills which everyone must acquire if he is to be an

educated and an intelligent person. And, in addition, these knowledges and skills must be mastered by each individual. In other words, there are certain "sacred parcels" of knowledge and essential skills which everyone should master if he is to obtain an intellectual and cultural life.

Those who believe in this purpose of education say that it is essential for everyone to know when Columbus discovered America; to be able to write a chemical equation; to know the scientific names for flowers, plants, and parts of the human anatomy; to know the names and locations of the stellar constellations, and to read and interpret selected gems of literature. It doesn't matter whether these facts and skills can be used; -somehow their acquisition places a halo over an individual which helps him to live more successfully.

3. The third purpose of education was formulated after the establishment of the secondary school. Soon after the secondary school came into existence the colleges recognized the opportunity to use this institution in preparing students for college. As a result new subjects found their way into the high school curriculum. The influence of the college is very evident when one considers that, even though only 28% of our secondary youth go to college, the majority of the high school courses of study are still college-entrance subjects.

Though 72% of our young people do not go to college, many of those who are engaged in education believe thoroughly in a curriculum which prepares youth for college. Even in the face of facts, tradition, the impact of the past, seems to retard and pinch their freedom of thought. Early public education was an education for the few. Many selective factors operated which made it impossible for many young people to take advantage of formal schooling. As these deterrent factors were ironed out the elementary school gradually became an agency of mass and common education while the secondary school remained selective. Until the turn of the century the high school was primarily a college-preparatory institution with a curriculum based upon this purpose. In recent years the secondary school has experienced an enormous, almost unbelievable, increase in enrollment. Within 25 years the attendance has changed from one primarily interested in continuing in higher education to one which is now interested in preparing for the life after high school graduation, whatever it may involve.

With any such unusual change one would expect a corresponding change in purposes and a reorganization of the curriculum to point toward the attainment of those purposes. But such has not been the case. Close scrutiny of the secondary school curriculum today, as compared to that of 25 or 30 years ago, will show that but little change has been made. Not only are the subjects the same, but the content of the subjects is similar. There are, of course, a few new subjects to clutter up the already overburdened schedule; but in the main, the old courses of study have stood intact.

What defense mechanisms have been used to justify this static condition? The first and foremost is probably that of transfer of training. If pupils learn to think in the abstractions of geometry and chemistry they will learn

to think in everyday life situations. Fortunately, the psychologists have upset this wishful theory. Another argument is that the traditional subjects teach certain knowledges and skills which are necessary for everyone to know and practice. Still another is that everyone should go to college and the major responsibility of education should be to prepare students for college whether they go or not. A most interesting defense is that the colleges demand that the traditional subjects be taught. The scientific bases of these and many other defenses are questionable.

A unique attack on this problem has been made by many educators during the past twenty-five years. Realizing the need for new objectives of education, commissions have been set up to formulate new purposes for education. Thus, we have the Seven Cardinal Principles, and many other similar statements of educational philosophy. These statements have all proved to be functional and dynamic. They are accepted in educational circles and by those engaged in the teaching profession. But they have but little effect upon practice, because the teachers return to the classroom and teach as they have always done.

Has science instruction been consistent with the educational objectives set up in this discussion? The science curriculum has been patterned after the college curriculum. The greatest similarity occurs in the senior high school where even the subjects carry the same names as are found in college. However, there is much similarity in the arrangement of the content at all four levels of education -- the difference lies in the severity of disciplines and the technical approach. In observing the various compartments into which science has been placed -- physics, chemistry, biology, astronomy, and geology -- one wonders whether there really is any unity in science.

Much of our present day science teaching is based upon the assumption that certain facts are essential to the "good life". The intelligent person knows the law of universal gravitation, the scientific names of plants, and the theory of ionization. It matters not whether these facts will ever become useful to him.

Science instruction also assumes that skills acquired in science will carry over to life situations. Teachers of science have always been certain that the process of scientific thinking learned in the science class is readily usable in all life situations. It is interesting to note that little, if any, of our science instruction is organized so that reflective thinking is possible. Examine any science laboratory manual and decide for yourself whether the scientific method is possible if students use those manuals. Another assumption is that the accuracy and thoroughness learned in the laboratory will result in corresponding accuracy and thoroughness in any activity outside of the classroom. Perhaps some of the ladies would like to give testimonials about how their laboratory work in chemistry has improved their kitchen technique.

Many earnest and honest attempts have been made to improve the science curriculum. For many years science teachers and textbook writers have been aware that the technical type of science that is now being taught is not meeting the needs of the masses of students. Let us see what is being done about it:

1. Functional material is being "sandwiched" into textbooks and courses of study, but not at the expense of the usual logical sequence of content. Rather it is an "add to" and is often placed in the back of the book to be used if the class happens to get that far along. A good science book of 15 years ago was 500 pages in length -- today its size has grown to 750 pages.

2. Attempts are being made to integrate science. New courses such as physical science and life science are appearing in the curriculum. This provides a more flexible approach and if properly organized offers many interesting possibilities. However, such an attack may result in integration of subject matter but is certainly no guarantee of an integrated personality.

3. Another attempt to produce a science curriculum which meets the needs of pupils may be found in the formulation of new goals for science instruction. Some of the very best statements of goals have been made in the past few years. In their prefaces most of the lately published textbooks have statements of unusually functional objectives. It's exciting to read these statements but it's disheartening to thumb through the text and find that the author has attempted to use the same old subject matter in the attainment of those goals.

Having discussed the traditional, most accepted philosophy of education, let us now turn to a new philosophy.

This philosophy is not primarily concerned with subject matter, but rather with the growth and development of boys and girls. This philosophy states that the purpose of general education is to meet the needs of individuals in the basic aspects of living in such a way as to promote the fullest possible realization of personal potentialities and the most effective participation in a democratic society.[1]

Growth toward the democratic way of life is possible through:

1. Recognition of the uniqueness and worth of each individual.
2. Allowing for free play of intelligence.
3. Providing maximum opportunities for the individual to participate effectively in social living.

If democratic living is to become a reality to our youth, education must assume at least a part of the responsibility for helping youth to develop characteristics of behavior which lend themselves to democratic living. Such an approach to education would accept the acquisition of knowledges and skills only on the basis of their value in changing behavior. Such an approach demands the recognition of types of behavior which have often been referred to as the intangible objectives. What are some of the types of behavior which must be developed within the democratic philosophy? Some of the important ones are:

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1 Science in General Education ,Chapter 2

1. Habits
2. Attitudes
3. Abilities to think
4. Social sensitivity
5. Creativeness
6. Appreciations
7. Ideals and values

The development of these kinds of behavior can be accomplished if the right approach is made. Boys and girls do not change their behavior by force or by being told the specific type of behavior they ought to develop. Rather, they grow and change in behavior as you and I do -- through the usual process of learning. It is, therefore, important that we recognize and nourish the process of learning which may be incompletely described as follows:

1. Learning begins with problems that are meaningful to the individual concerned.

2. Tentative solutions of the problems are set up.

3. The process of verifying these tentative solutions requires the collection of pertinent data which lends itself to the solution.

4. The data is classified, analyzed, and tested.

5. Conclusions or solutions may be drawn from such data.

6. The learner then acts upon the basis of such solutions.

A curriculum based upon this new philosophy of education would originate in the problems that are meaningful to students at their maturity level. It would provide for objectives which develop the individual's behavior in consistency with democratic living. Such a curriculum would be organized so that the process of learning would be given free play. Knowledge and skills would become a means to an end -- not an end in themselves. In other words, facts and skills would be valuable only in so far as they contribute to shaping behavior which is consistent with democratic living.

How can the science program be reorganized so that it will contribute to this philosophy?

1. In the first place the subject matter boundaries must be removed. Problems that are meaningful to young people have no respect for such boundaries.

2. Science teachers must understand the growth and development of young people. They must experience a "rebirth" by focusing their attention upon the growth of our youth rather than upon the logical sequence of subject matter. This new emphasis will help teachers to discover the concerns and problems of young people.

3. The science curriculum must begin with the concerns and problems of young people. These concerns and problems should be those to whose solution science can contribute. The solution of many of these problems

will often draw upon other fields of learning.

4. New areas of experience must be set up which will provide an opportunity for students to express their problems freely. Such areas as matter and energy, mechanics and heredity, are so far removed from meaningful experience that young people are immediately blocked in expressing their problems. Areas based upon science as it relates to the individual, the home, and the community, offer many more possibilities in discovering the real concerns of young people.

5. The objectives set up for such a program should be in terms of those types of behavior which help to develop the democratic way of living. To do this the teacher and students will consistently relate the solution of problems to the kinds of attitudes, habits, appreciations, etc., which may be expected to develop in the process of solution.

6. Teachers of science must learn to plan with pupils. This is essential if the meaningful problems of pupils are to be discovered. In the planning process, problems which are common to the group should be determined. However, it is important that the special individual concerns be given attention either in the class situation or through some provision in the curriculum.

7. Last but not least, through the curriculum teachers of science must make pupils conscious of the goals of education. They must help the pupils to discover where they are in the process of growth and must help them to evaluate their progress.

In conclusion it may be said that the science curriculum in our schools today is serving youth ably if one considers the purpose of science education to be helping pupils to acquire knowledges and skills.

However, if the purpose of science instruction is to aid pupils to grow--to develop types of behavior which will make possible the democratic ideal, it must be said that science is failing in its mission. The contributions that science can make to better living are unlimited. The science teacher is charged with the responsibility of making science function in the lives of our young people.

GENERAL SEMANTICS AND PSYCHOTHERAPY

Douglas Gordon Campbell, M.D., Assistant Clinical Professor of Psychiatry, University of California; Consulting Psychiatrist, Mills College

General semantics designates a general theory of human evaluation, representation, and communication formulated by Alfred Korzybski in 1933.[1] The term semantics was adapted by writers prior to Korzybski from a Greek root translatable as meaning, signification, evaluation. In brief, where science concerns itself with fact to fact relationships, logic with word to word relationships, semantics deals with the relations between facts and words. These relations between empirical happenings and their symbolizations involve complex neurophysiological processes of abstracting, symbolization of abstractions, and the reflexive effect of symbolism upon further abstracting. Human knowledge has thus a circular, or more strictly speaking, a spiral structure. Because of this fact a general epistemological theory, or "knowing about knowing", becomes essential to human development.

Uhlike previous epistemologies, "psychologies of knowledge", theories of symbolism, etc., general semantics is not speculative but experimental. It is based upon contemporary neurophsyiological and neuropsychiatric research which it synthesizes to produce an empirical, strictly biological general theory of evaluation. It is "not a medical science but like bacteriology, it is essential to general medicine and psychiatry."[2] Medicine, without psychiatry and psychosomatic considerations, would be little else than an elaboration of veterinary science. Psychiatry, without a general theory of evaluation based on human neurophysiology, comparative anthropology, etc., becomes a congeries of old and new metaphysical systems, pre-scientific "psychologies" and pseudo-scientific gossiping. No one will deny the polemics of "schools", the confusion of tongues and the conspicuous lack of a unifying doctrine based on human biology and comparable in methodolical efficiency to the physical sciences. As psychiatrists dealing with personal (and social) problems of evaluation, we have been misled by our own personal standards of evaluation, and by language, principally because we lacked a general theory covering these aspects of human reactions.

It is not denied that certain "schools", e.g., the Freudian, within psychiatry have not only sensed this state of affairs but have devised procedures to eliminate the personal bias in evaluation and they have sought to supply unifying methodologies and languages. And there is a trend toward the utilization of comparative data from societies outside that community within which the psychiatrist and the patient function and are related. Nevertheless, despite the accumulation of valuable data, much of it

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1 Korzybski, Alfred. Science and Sanity, An Introduction to Non-Aristotelian Systems and General Semantics. Two editions, Science Press, Lancaster, Pa., Distributors. Also obtainable from the Institute of General Semantics, Chicago.

2 Korzybski, Alfred. General Semantics, Psychiatry and Psycho-Therapy. Paper read before the American Psychiatric Association at Cincinnati, May 24, 1940.

is vitiated by the underlying (and mostly unconscious) assumptions which directed both selection and formulation. The very instrument of investigation and communication --language itself--has been neglected.

The role of language in human affairs was sensed, intuitively, by the artist long before scientific recognition occurred. Apart from the now largely sterile contributions of earlier philosophers and philologists little was done about language until the growth of the physical sciences necessitated better forms of representation. With the development of mathematical language, (obligatory in science because of the inadequacy of ordinary "tongues"), an interest in the process of symbolization and the structure of symbol-systems appeared. Mathematical "logic" developed and influenced the epistemologists, "logical positivists" and others to produce "symbolic logic".[1] Investigators became preoccupied with the invention and structural characteristics of various symbol-systems as forms of representation for physical or epistemological data and as interesting devices in themselves (e.g. "pure" mathematics, "pure" logic). The insufficiencies of ordinary language were recognized. The use and abuse of "classical logic" was thoroughly investigated. New forms of ordinary communication, such as Basic English[2] were devised to overcome the obsolete structural features and other shortcomings of speech. But no investigators, until Korzybski [3] treated language, and symbolization in general, as forms of human behavior.

Searching for a sharp distinction between human and animal biology, Korzybski found it to lie in the capacities of human nervous systems to represent their experiences by varieties of communicable symbols which could be accumulated and transmitted to subsequent generations. By neurological means human beings built an environment of symbol-systems which, like any other stimuli, would condition adaptation. Individual experience could thus be summarized, transmitted, accumulated as racial experience and influence the conduct of future generations. Obviously, this is the source of so-called "culture". Systems of symbols standing for racial experience constitute a "culture" and appear in protean forms ranging from "material culture", (pottery, buildings, etc.) through the arts (dance, music, etc.) to languages (doctrines, creeds, cosmologies, social systems, sciences, etc.). This process of symbolization which made possible the accumulation of the experiences, knowledge, evaluations, etc., of individuals for racial purposes, Kor-

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1 Of little practical value to psychiatrists but of great theoretical importance because of the light they throw upon symbolization in general as a form of human activity; the interested reader is referred to the introduction of Russell and Whitehead's Principia Mathematica and to recent individual works by these two authors: P.W. Bridgeman's The Logic Of Modern Physics; Ogden and Richards', The Meaning of Meaning; Carnap's Symbolic Logic, and the International Encyclopedia of Unified Science, among other works, should be consulted.

2 Ogden, C. K. Basic English, Harcourt,Brace. N.Y.

3 Korzybski, Alfred. Manhood of Humanity, 1925 Dutton, N.Y.

zybski designated as time-binding.[1]

Time-binding is made possible by the development of the human neopallium which Herrick [2] has called the "organ of time-binding".

W. A. White pointed out that because of the time-binding function of human nervous systems biology has acquired, at human levels, a new dimensionality --"a temporal co-ordinate".[3] Human environments are predominantly the products of time-binding, (symbol systems of various kinds), for even their material aspects are modified through symbolically transmitted experiences, needs, etc., and material objects become symbols for evaluations of various kinds. Our relations to "realities" are chiefly indirect through the agency of symbols for these "realities".

Languages, being symbol-systems, are products of human nervous systems. Therefore, they should be treated as forms of human behavior and the methods of the biological sciences employed to investigate them. This is particularly important because of the fact that human behavior is conditional upon neuro-symbolic features of the environment. It will not be possible in this short essay to do more than indicate the main trends of the biological investigation of the production of symbolism and human reactions to the symbols of language. The literature is thoroughly surveyed in Korzybski's text, Science and Sanity.[4] In addition, illustrating the neurophysiological mechanisms involved, the reader is referred to Ischlondsky's work. [5] There is a profuse and growing literature [6] on the non-biological aspects of language which is not relevant to the purposes of this paper.

Neurologically considered, symbolization occurs at later stages of processes which begin at receptors in direct contact with the internal or external continuum of events of which the "organism" is part. Energy transformations in nervous tissues, spoken of collectively as the "nerve impulse", take place sequentially from receptors to higher centers and thence to effectors. They have varying, but finite, velocities. This fact, of crucial importance for a neurophysiological theory of evaluation and representation, was first applied by Korzybski. It establishes an ordering of "levels" in the transmission of the nervous impulse.

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1 Korzybski, Alfred. Time-binding: The General Theory. Presented before the International Mathematical Congress, Toronto, 1924. Time-binding: The General Theory. Second Paper, presented before the Washington Psychopathological Society, March 13, 1926; and the Washington Society for Nervous and Mental Diseases, 1925. Manhood of Humanity, Dutton, N.Y.,1925.

2 Herrick, Judson

3 White, W. A. Twentieth Century Psychiatry. Salmon Foundation Lectures.

4 Op.Cit.

5 Ischlondsky, N.E. Neuropsyche und Hirnrinde. Two volumes. Urhan u. Schwarzenwald. An English translation is expected next year.

6 See the works of Ogden and Richards, I.A. Richards, Britton, Goldberg, Chase, Hayakawa, Sapir, and others, to mention only a few.

Furthermore, each level or center reacts to certain characteristics of the electro-colloidal nervous process and establishes new reactions which are transmitted to higher or more remote centers. Thus the thalamic region, as a sensory synaptic center, reacts to certain characteristics of impulses reaching it and contributes affective tone. Other "higher" regions react to specific features of impulses reaching them to provide epicritic modalities. At levels where imagery occurs certain products of lower centers are selected from a background, related in temporo-spatial patterns and have varying degrees of consciousness. From these, details or parts may be isolated to function as forms of representation or symbols. And these may be reproduced in extra-neural forms through the effectors of the organism. To this immensely complex and as yet only partly understood process, Korzybski has applied the generalizing term abstracting [1].

Our acquaintance with happenings in the internal or external environments, then, is a product of the abstracting abilities of our nervous systems, e.g., the greenness of a leaf, the speed of a motor car, the placing of a memory, etc. Abstracting occurs normally in a certain temporo-spatial order, determined by the structure-function of nervous systems and the finite velocity of nerve impulses proceeding from lower to higher centers, relating separate analyzers, etc. At certain higher levels symbols are produced to represent lower orders of abstraction: languages appear. The symbols of language are higher order abstractions and stand for the experiences, abstractions, etc., of lower centers.

The abstracting capacities of human nervous systems are limited to certain ranges of light or sound waves, vibrations, intensities, etc. Beyond these ranges they cannot go, unless aided by extra-neural abstracting instruments such as the microscope, potenticmeter, etc. But these are comparatively recent inventions to give man more detailed acquaintanceship with himself and his milieu. Primitive man had only his unaided "senses" to give him experience necessary for survival. Consequently his higher abstractions--symbols of language, etc.-- represented only crudely perceived areas of his world. Unaware of the role of the nervous system in abstracting, (which makes the observer part of all that is observed), primitives, like our own children, naturally enough assumed that what we now recognize (through scientific knowledge alone!) as projections, e.g. the greenness of a leaf, were "properties" or parts of "objects" and had independent existence.

Our ordinary language provides proof. Being of primitive origin, it is composed of terms for projected "sensations", terms for parts of inseparable processes, terms establishing false-to-fact relationships, etc. Under simpler conditions of life such a language was adequate enough, but in the scientifically produced world of today to which we must adapt ourselves, it is hopelessly inadequate. It was based on macroscopic, crude "sense" abstractions whereas it is obligatory today that we abstract and represent microscopic (say, bacteriological) and sub-microscopic (physico-chemical, electrical, etc.) happenings. The old neuro-linguistic systems falsify life for modern man. Because of this the development of adequate, scientific languages like mathematics was forced upon us in the interest of survival. Sur-

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1 Korzybski, Alfred. Science and Sanity, Chap. XXIV, p.371.

vival value, usefulness, is the ultimate test of any language and is best tested by the capacity of the language not only adequately to represent "reality" but to predict unrecorded or future happenings.

It is the structure of a language which determines its value as a system of representation and makes predictability possible. Just as visual imagery, internal or projected, must resemble the empirical happenings of which it is an abstraction to be a guide to action, so should the symbols of language -- a higher level of abstraction-- represent the structural features of the visualizations. A map, to be useful for survival in travelling, must be similar in stmucture to the territorial facts. In the U.S.A., Chicago lies between San Francisco and New York City. If a map represented it as elsewhere, the structure of the map would not correspond with the actual structure of the territory. Not being similar in structure, its usefulness for human survival, for purposes of transportation, would be poor: it would lack predictability. Structure is a function of relations, (e.g. distances and times between cities) and relations are established by order, (betweenness). These terms are undefinable since they are interconnected and derived directly from observations made at lower levels of abstraction.

The relationship, through structural similarity, between map and territory applies to the symbols of language and whatever order of facts they are designed to represent. And, for that matter, to all symbolism. A word or a statement should be similar in structure to the empirical data it represents. Consider some of the structural features of our habitual tongue, derived as mentioned before from "superficial" macroscopic abstractions and accepted unwittingly because sanctioned by antiquity, custom, usage, etc.

Composed of terms sanctioned by the lexicon, which are arranged in certain "orders" and "relations", prescribed by laws of logic, syntax, grammar, etc., the structural abstractions conveyed by ordinary language are frequently those of pre-literate humanity. Because of these structural facts, ordinary language may be considered the chief source of culture-lag. And the most insidious and dangerous source because the least conscious. Consider terminology. Many words are labels for artifically isolated characteristics, like symbolism generally. As parts of wholes, or as analogies (metaphor), they should recall the complete configuration. But if the configuration giving rise to the symbol belongs to antiquity, the term becomes meaningless or it may be adopted for a new constellation to which it may have no apparent, structural connection -- e.g. "sailing" for the departure of a stream-lined train.

A great many words are elementalistic (Korzybski) : they label crude "sensory" abstractions such as "object", "subject", or artificial constructs ("concepts" of the type "mind", "body", "space", "time," and the like. It is a matter of great importance for neuro-psychiatry that these elementalistic terms are usually paired and represent so-called antithetical "thought", dualistic "philosophies", etc.

Still other terms in common usage have literally no meanings apart from their context of usage. These may be called multi-ordinal terms(Korzybski). Their meanings change with context or level of abstraction, e.g. "fact", "reality", "society", "order", "relation", "love", "anxiety", etc. They are

legion. They make for flexibility and generality on the one hand, for rigidity and restriction on the other. The term abstraction, along with similar multi-ordinal terms, provides a linguistic methodology for bridging and unifying many sciences. But terms like "love", "reality", "anxiety", and countless others often engender confusions, bitter arguments, and they frequently generate psycho-pathological reactions. "Love of love", is not the same as "love", whatever facts of observation the term "love" may represent. "Anxiety about anxiety" or "anger about anger" constitute well-known neurotic mechanisms. For it is the order of abstraction that matters, that determines the evaluations underlying the term. Many neuroses appear to be based on multi-ordinal mechanisms of this type. In part, at least, they account for "talking ourselves" into sickness.

Just as there are different systems in mathematics, such as Euclidean and non-Euclidean geometries the structures of which differ due to the introduction of new postulates ("order", "relations", etc.) there are different linguistic structures or "logics". It is convenient to distinguish Aristotelian from non-Aristotelian systems.[1] Like non-Euclidean geometries and non-Newtonian physics, non-Aristotelian systems are part of the emergent new orientations of the day. Previous systems are included as limited cases; they are not excluded. No "dichotomies" are established as some antipathetic reactionaries would misapprehend the issues involved. The new symbolic structures are a product of new structural data obtained by contemporary scientific methodologies. As such they negate many of the assumptions, propositions, etc., established as "true for all time" by the old orientations. They negate them by limiting them to certain conditions, levels, etc., of empirical observations. These conditions or levels may be termed pre-scientific and are comparable to the crude observations of contemporary "primitive" peoples or children. Based on "sensations", macroscopic generalities, lack of knowledge of projection mechanisms, etc., their guess-work (hypotheses, theories) led to animistic constructions and notions of "entities", old "infinity", "identity", and the like. Consequently these earlier representational systems preserved such structural abstractions and appear to us as unnecessarily absolutistic, dogmatic, rigid, etc.

The "is" of identity

Attention should be called, among other things, to the subject-predicate form of our language (the Indo-European group in general), and to the verb "to be". The subject-predicate structure seems to be a reflection of archaic assumptions of "causation" of the type "cause and effect", "subject vs. object", and so forth. The verb "to be" has at least four common usages: to indicate existence ("I am"), as an auxiliary verb ("I am running"), for predication ("the rose is yellow"), and the "is" of identity ("the rose is a flower"). The first two forms are practically unavoidable. The last two imply false-to-fact structural assumptions of the general type of identification. For the rose is not yellow; it is perceived as yellow, a

1. Science and Sanity, Chapter VII

phenomenon of projection, etc. and it is classified as "a flower", etc.

Through the "is" of identity many identifications are assumed and the unconscious assumptions may lead to psychopathological reactions. Identification is assumed in the Aristotelian systems, the "logic" of which follows the structure, "A is B or not B" [1]. At sub-microscopic levels identity cannot be found: it appears as an artifact of crude "sensation", a generalization which became a standardized assumption and corner stone of classical "logic".

Generalization and Differentiation

The earlier symbol-systems were usually generalizations from a few abstracted characteristics. Not only was this due to leaving out characteristics, which, if included or allowed for would alter the "order" and "relations"(and, therefore, the assumed "structure"), but it was due to the well-known neurophysiological finding that generalization precedes differentiation. This principle has phylogenetic and ontogenetic applications. It has determined the structural implications of much "primitive" linguistic representation, the older "logic", etc. In establishing a conditional reaction to any variety of stimuli the first reflex is generalized -- a reaction to all sounds, all lights, etc., within a given range. It is later differentiated -- a reaction to a specific sound, a specific light, i.e., to modalities or differences. Differentiating mechanisms are principally "cortical" in location, a function of so-called "cortical inhibition". If generalized conditional reactions are symbolized, the structural implications will also be general and will communicate notions of "allness","either-or", "identification", etc. When differentiated reactions are symbolized, these false-to-fact structural abstractions will be replaced by notions of the type "not all", "degrees of", "non-identity", etc. Protopathic abstractions become epicritic when differentiation occurs. Language, and other symbol-systems, change from one-, two-, or few-valued structures to multi-valued ones. [2].

"Primitive" languages show this phenomenon of generalization in so-called "complex thought" (Levy-Bruhl, Vigotsky, and others). They are also more pictorial and therefore apt to be much more extensive; for each "picture" requires its symbol as in old Chinese. Because "primitive" languages are at a lower level of abstraction where imagery is syncretic and affectively-toned by "thalamic" centers, the representations seem not only closer to external happenings but part of them. Even verbal symbols may be considered to be part of the "objects" they "name", as in the "verbal magic" in children and "primitives". This must be the neurophysiological basis for Levy-Bruhl's "law of participation".[3]

"Civilized" languages, especially scientific ones, show more differentiation. As higher abstractions are formed, certain characteristics are disregarded for practical purposes of "classification", etc. The new repre-

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1 See Science and Sanity, p.194
2 Science and Sanity, pp. 92-94; pp. 463-464.
3 Levy-Bruhl, Lucien, How Natives Think. George Allen and Unwin. London

sentations lose their semblance to "reality" and also, often, their "thalamic" feeling tone (which seems to occur under "normal" conditions only at lower, "close-to-life", levels of abstraction). These higher order abstractions may be grouped according to "use", "need", etc. They are usually called "condepts", "guiding fictions"(Vaihinger) [1], "constructs", etc., at these levels but would be more appropriately labelled "higher orders of abstractions". (Korzybski). The use of "inherited" representations of this type does not connect the individual learning such a language with "reality". He has no experiences like the words used, e.g. "fascism", "industry", "electron", or he attaches such labels to unique, personal experiences and cannot use them as high order generalizations. Therein lies their danger.

Inseparability of symbolism and evaluation

These features are merely the more prominent ones in linguistic structure. For an exhaustive treatment the literature must be consulted. Since languages possess these structural characteristics which, consciously or unconsciously, condition our orientations, evaluations, etc., the linguistic and other symbolic aspects of human environments should be designated as neuro-symbolic. Symbols do not exist apart from meanings, interpretations, evaluations, etc. These can be found only in nervous systems producing symbols or reacting to them. The neuro-symbolic environment, then, is not only a product of human abstracting-mechanisms, i.e. of evaluations of some order, but it conditions neuro-psychic reactions.

These neuro-psychic reactions which are conditional upon neuro-symbolic structural abstractions may be termed semantic reactions(Korzybski). Such a term, like Loeb's "tropism" is a general tenm with organism-as-a-whole implications. It does not split "intellect" and "emotion". It implies an organism-environment continuum. Where "tropism" covers non-elementalistic physico-chemical reactivity, "semantic reaction" (or evaluational reaction) covers all varieties of human reactivity to symbols, and their inter-connected meanings. The prefix neuro- is a vocal and visual reminder of the role of neural mechanisms and warns against treating symbolism of any variety in "academic" isolation as many students appear to do.

Psychopathological Mechanisms

Natural order of abstracting

As pointed out above a definite, sequential, order of abstracting is established through the finite velocities of nerve currents traversing pathways, levels, etc., which have a predetermined spatial arrangement.
These factors make nervous systems four-dimensional in structure (structure-function). Any abstraction, be it a "sensation", a "memory", a "feeling", a "fantasy", should therefore be allocated in a space-time configuration. Abstractions at lower regions,(e.g. the thalamic area) occur before those of higher regions (as cortical levels), on afferent pathways, and in the reverse order on efferent routes.

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1 Vaihinger, Hans Philosophy of As If, Harcourt, Brace, N. Y.

Due to the slower maturation of human nervous systems, (higher cortical functions being in abeyance before the fourth or fifth year and not fully mature until late adolescence) conditional reactions to the neuro-symbolic environment are established at sub-cortical levels first. As the cortical analyzers develop, the nerve impulses travel longer circuits (association paths, etc.) differentiation of incoming stimuli occurs and so-called "inhibition"[1] of earlier, lower-center reactions follows. Speaking roughly, the "cortex" directs the "thalamus". When cortical analyzers are included in the circuits of nerve impulses there occur automatically and integrally , as Herrick points out, differentiation (analysis), delaying of reactions (so-called "inhibitions"), differential activation of lower centers, and dynamogenic effects. These cortical factors of evaluation are essential for human survival. Impulsive, undelayed, "thalamic", reactions belong to animalistic, infantile, and "primitive" types of adaptation. Being diffuse, generalized reactions, they are increasingly maladaptive in proportion as the environment becomes more complex.

In language development, both in its phylogenetic and ontogenetic aspects, this sequence from generalization to differentiation occurs.[2] The symbolization of lower centers,like their imagery, is diffuse, syncretistic, affectively colored. Single words, or pictures, represent complex structures which are broken down into component parts by higher analytic centers. The component parts are isolated, distinguished by qualifying devices, and their relations to each other are indicated. Thus we have names for parts of wholes, names for relations, actions, etc. And we attach "affect" to those parts, relations, actions rather than to the whole fused structure as at lower levels of abstraction. At these higher levels we abstract characteristics that "interest" us, and form classifications or generalizations of higher orders. We play with these inferences, generalizations, classifications and make further ones from them. There is no end to the process.

But there is, or should be, an orderly sequence to it. We should abstract from scientific "events" (happenings on the sub-microscopic level) and construct objects -- macroscopic "percepts", "feelings", etc. These are not words or other symbols; they consist in "silent" experiences. When we describe them we abstract some characteristics, leaving out others. Here is the first level of symbolization -- the "description". From descriptions we abstract inferences and from inferences of low order inferences of indefinitely higher order may be abstracted --generalizations, classifications,etc.-

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1 Korzybski, applying Herrick's analysis of "inhibition", suggests using the terms positive and negative excitation. It is a matter of orders of excitation, cortical centers reinforcing or altering ("inhibiting") the excitations from lower centers. See Science and Sanity, Chap. XXI, XXII.

2 See the writing of Piaget, Language and Thought of the Child, Harcourt, Brace, N.Y. and,in,particular, Vigotsky (translations from his Russian work entitled Thought and Speech, which appeared in Psychiatry, Vol. II, No. 1, February,1939)

which may be symbolized by devices of any variety. And these devices should be evaluated as symbols for higher order abstractions when we are "reading" our neuro-symbolic environment. Such high order abstractions, the product of cortical analyzing mechanisms, should initiate differentiated reactions, and not low order, generalized ones of undelayed "thalamic" type.

Disordered evaluation

When these orderly sequences of abstracting are disturbed, psychopathology occurs. Irregularities of "timing" and "spacing" of abstractions produce improper evaluation either of low order occurrences such as objects, or of high order abstractions like "thoughts" or symbols. Two inter-connected types of pathogenetic mechanisms may be distinguished for the practical purposes of diagnosis, prognosis, and therapy (education). They are limitation and confusion of orders of abstraction. Their separation is schematic; each affects and is related to the other.

Limitation of orders of abstraction is found in the amentias and dementias. Enviro-genetic agencies may produce structural lesions of gross "anatomical" or subtle "physiological type". Abiogenesis and degeneration, toxic-inflammatory processes, new growths, vascular diseases, psychoses of long standing, etc., play their roles. Whatever the factor, whether primary or secondary, there is a quantitative defect. Centers, pathways, synapses, neurones, etc., either do not develop or are destroyed so that the nerve impulses traverse only lower centers or are blocked from certain regions. The characteristic limitation is an inability, varying from case to case, to produce the higher orders of abstractions necessary for adaptation to "unrestricted" social life. " Feeblemindedness" of various grades occurs. The patient never attains certain "mental-age" levels, or he is permanently reduced from higher levels of integration. The condition is anatomically determined and irreversible.

Confusion of orders of abstraction may occur in highly developed nervous systems. It is qualitative in character, a "functional" derangement and, up to a point, reversible. The mechanism involved is a disordering of the established space-time sequences of abstracting. High order abstractions may be evaluated as low order ones. A symbol may be treated as the "percept" it represents; or, vice versa, an object which is meaningless to other members of the neuro-semantic community, is evaluated as a symbol. "Feelings" may be attributed to inanimate objects, or to people, through disturbances of projection mechanisms. "Thoughts", "concepts" and the like are evaluated as actualities which may be "located" in the organism-environment continuum. Parts are treated as wholes, and the reverse. Past experience may be evaluated as contemporary "perception" or foresight. Inferences may be confused with descriptions, generalizations of high order with those of low order, multi-ordinal terms like "right" may be displaced from one context to another. Symbols, especially those of language, are not "read" correctly, private evaluations are attributed to them, wrong inferences drawn, etc., etc.

An adequate description would cover practically the whole field of psychopathology and involve most reaction types including many of the previously

mentioned "limited" forms. Causative factors of confusions of order range from macroscopic to sub-microscopic lesions. The "organic" reaction types, due to mechanical, vascular, toxic-infections, new growth, degenerative, etc., agencies, show confusions of orders which are in part specific for the "disease", in part determined by the pre-morbid personality. Consider the deleria of fevers or the delusions of peresis. The so-called "functional" reaction-types show varieties of confusion which become sufficiently standardized, apparently by factors belonging predominantly to the pre-morbid personality structure, to permit diagnostic and prognostic classifications. They range from mild neuroses (including "behavior problems" of children) to psychoses of cyclothymic or schizophrenic type (including "pure" paranoia). And it must not be overlooked that transitory or relatively permanent disordering of space-time sequences of abstracting occur in so-called "normal" persons. As a matter of fact, in the Indo-European neuro-symbolic and neuro-semantic environments, such disturbances are necessarily pandemic for reasons mentioned elsewhere in this article.

It is seen that general semantics has abstracted the structural implications of the biological and physical sciences and has synthesized a general theory of human evaluation and representation. Languages of various types, by means of which "knowledge" is recorded and communicated, (time-binding) are treated as neuro-symbolic products of neuro-semantic (evaluational) mechanisms. Thus as forms of human reaction, they show varying degrees of survival value for human adaption according to their structural implications. Scientific languages, e.g. mathematics, have the highest predictability value and thereby produce maximum probablility in the limited range of human activities -- sciences-- with which they deal. Ordinary secular language, being archaic-primitive in origin, has many structural faults and has poor predictability value in a very wide range of vitally important human affairs such as those of interpersonal or international relations. The language of neurotics and psychotics, (or, as a general class, the <u>un</u>sane), shows various disturbances of neurophysiological abstracting mechanisms so that it has the lowest value as a medium of representation and communication. Communication, within oneself or to others, depends upon these forms of representation so that, if evaluated as types of human reaction, we may estimate the potentialities for ultimate survival of either individuals or societies. "By their tongues ye shall know them."

Our neuro-linguistic and neuro-semantic environments are unavoidable conditioning factors for human development. We are born into a language and unconsciously acquire the evaluations, structural assumptions, etc., it represents. These may grossly <u>mis</u>represent current "realities" yet, without education in scientific knowledge, we are defenseless and may blindly follow these obsolete maps. For example: the <u>two-valued</u> Aristotelian logic, implicit in ordinary language, conditions us to look for fictitious entities such as <u>cause</u> and/or <u>effect</u>, <u>mind</u> and/or <u>body</u>, <u>emotion</u> and/or <u>intellect</u>, and assumes countless false-to-fact dichotomies. Its <u>elementalistic</u> terms misrepresent the contemporary scientific discoveries of multi-dimensional electro-magnetic regions, of organism-environment continuums, etc. <u>Multiordinal</u> terms are insufficiently differentiated by contextual definition so that we are misled as to what levels of abstraction they refer, with consequent misunderstandings and disagreements, etc. The verb "to be" insidiously assumes

the identification of parts with wholes, of inferences with descriptions, of individuals with classes of individuals and other disordering of levels of abstraction. And the self-reflexiveness common to all forms of representation is insufficiently distinguished by syntactic devices so that statements of different order may be equated, thus producing further neuro-semantic confusions. These observations of our neuro-linguistic matrix represent only a few of its more apparent structural defects. Prior to Korzybski's systematic neurophysiological analysis of languages we were, at the most, only vaguely, intuitively aware of our neuro-linguistic and neuro-semantic environments as pathogenetic.

The observation that the structure-function of human nervous systems produces different orders of abstractions, occurring sequentially from lower to higher levels and return, provides us with a mechanism of great importance. We can make a sharp theoretical, distinction between correct and faulty abstracting (evaluation). Correct evaluation of any happenings in the organism-environment continuum depends upon correct ordering, "timing", of the abstracting process. The nervous impulses should traverse their pathways, eliciting the functioning of different regions, according to a definite temporospatial configuration. Faulty evaluation is a result of disordering of the abstracting process, with the results that potentially dangerous synchronic or dyschronic stimulation of brain regions occur. This produces confusion of levels of abstraction and appears as psycho-pathological identification.

We know also, from reflexology, that generalization precedes differentiation. In terms of abstracting in different time-space orders, generalization is a function of centers, or brain regions, which are both phylogenetically and ontogenetically older. Differentiation is a more recently acquired brain function, attaining its highest development in humans. Roughly speaking, generalization (neurologically defined) is predominantly an "old brain function"; differentiation, a product of the "new brain". Schematically it is probably justifiable to allocate the former to sub-cortical, thalamic region levels; the latter to cortical, particularly frontal, levels.

It is also important to realize that the human nervous system is incompletely developed at birth; that lower centers, e.g. the sub-cortical, being racially older, mature first and higher, cortical, centers last (at about physiological maturity). This means that children, cannot abstract to as high levels as adults; that their first acquaintance with any events tends to be generalized; that their capacity to differentiate is relatively limited and only acquired gradually with physiological maturation. This has important, but frequently neglected, implications for education.

The abstractions of subcortical, generalizing levels tend to be agglutinative, syncretic, diffusely and strongly affectively toned. They are protopathic generalizations of the types: "everything is fused with everything else", or "everything is either pleasureable or painful". They are due to thalamic activities. Higher, differentiated abstractions tend toward qualities of temporo-spatial precision; they distinguish degrees or modalities of pleasure-pain, etc. They may be classed as epicritic. In their highest forms, as symbols of various kinds, affective coloring may be eliminated.

Lower level, "thalamic", abstractions, being visuo-kinaesthetic, seem close-to-life; higher level symbols, shedding sensory and affective characteristics seem remote-from-life. At higher levels, along with verbal symbols, a new type of generalization occurs. It is produced by abstracting relevent characteristics from lower level empirical observations to form notions of classification, e.g., mammals, Jews, schizophrenia, etc., Terms for these higher order abstractions tend to be over defined[1] They may imply too much or too little. Frequently they do under not evoke visuo-kinaesthetic imagery and consequently they seem "meaningless".

Psychopathological Identification

If higher abstractions, such as verbal symbols, are evaluated as lower responses to happenings, objectification occurs. This happens so generally under present neuro-semantic conditions that it may, paradoxically, be taken as "normal", "only too human", etc. Consider the organismal reactions of salivation to the word "lemon" on a hot dusty day when they are appropriate only to certain characteristics (acid-taste-receptor relations, etc.) of the "object"! Objectification, also spoken of as "hypostatization of fictions" and "reification", is the mildest disturbance of human abstracting processes. It is most prominent in "primitives" and childhood; in adults it is usually associated with catathymically directed activities such as political or religious orientations.

When, through disturbances of projecting mechanisms, lower "sensory" levels of abstracting are confused with those higher levels where "memory", "wishes", "expectations", etc. come into play, we have illusion or even hallucination. And when higher generalizations (over defined terms) are projected under the pressure of affective states, under delusion occurs.

The general mechanism underlying these psychopathological identifications appears to be confusion of orders of abstracting. The "timing" and "spacing" of various types or orders of abstractions is disturbed. Memories may be evaluated as realities, (e.g.,deja vu phenomena); notions, opinions, judgements, etc., may be treated as empirical data, thoughts as "voices", etc. Varying degrees of disorientation to life occur as a result. The etiology of disordered abstracting varies from macroscopic structural lesions to sub-microscopic, electro-colloidal disturbances produced by physico-chemical or neurosemantic ("psychogenic") agencies. The nosology ranges from quantitative defects (e.g. the amentias) to qualitative, "functional", disorders (e.g. schizophrenias).

When disordering of abstracting is consequent upon neuro-symbolic and neuro-semantic agencies we may speak of the reactions as semantogenic.[2] This is a better term, because non-elementalistic, than "psychogenic"or"functional".The principal sources of semantogenic disorders are to be found in

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1. Korzybski, Alfred. Refer to A.P.A. paper obtainable from Institute of General Semantics, Chicago
2. Johnson, Wendell; General Semantics and Speech Disorders, obtainable from Institute of General Semantics.

the conditional reactions established to the symbols and structural implications of ordinary language.[1] Misleading evaluations and disorientations are channeled into immature nervous systems, or produce conflicting excitations,[2] so that misdirected or confused behavior results. Two interrelating types of disturbed evaluation are recognizable. One, which is basic and found in most members of western societies, appears as a diffuse, general, characterological disturbance which is frequently spoken of as "Character Neurosis"[3] or as "The Neurotic Personality of Our Time".[4] The other type, developing frequently out of the soil of a general twisting of personality development, is represented by more sharply delineated "neuroses", and by certain psychotic reaction types.

Semantogenic disorders range then from the minor maladjustments and disabilities (e.g. "reading" disorders) to acute and prolonged psychotic disorders. And as yet undetermined numbers of these reactions appear to be predominantly the result of faulty conditioning to the symbols of language. In others a variety of actual injuries, (mechanical, toxic, etc.) to the nervous system interferes with the abstracting properties of various levels in the nervous system. In all of them the capacities of nervous systems properly to evaluate linguistic and other forms of representation in the symbolic environment are disturbed. The treatment of these disorders involves the search for the special irritants producing them and a general system of re-education, the aim of which is training in proper evaluation. Therapeutic procedures belong principally to the trained specialist for they involve a comprehensive medical knowledge and, in addition, techniques of semanitc analysis. Until recently semantic analysis has existed in various schools of psychotherapy. Their methods have been limited, time consuming, and expensive, and they have lacked a general theory. General Semantics not only offers a unifying general theory, but has developed methods, applicable to groups for example, which materially reduce the duration, cost, and extend the range of usefulness of psychotherapy.

The discovery of these mechanisms of human evaluation and their formulation into a system by Alfred Korzybski, does much more than offer new therapeutic devices. They provide an enormous advance toward the goal of prevention since they are applicable in education. The methods of General Semantics can be applied with suitable adaptations to young children as well as to adults. Teachers, no matter what their specialty, can use these methods and thus establish patterns of evaluation which will lead to flexibility and correct-to-fact adaptation as surely as older methods developed rigidity and false-to-fact adaptation. By these methods we develop a "linguistic conscience", learn to orient ourselves by facts rather than fancy or misleading verbiage, become balanced personalities with a stability that is not easily shaken by propagandists and others who misuse symbols for their own personal aims.

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1. Ischlondsky, N.E.
2 Lynd, Robert. Knowledge for What? Princeton University Press, 1939
3 Alexander, Franz. The Analysis of the Total Personality
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SEMANTIC ASPECTS OF THE READING PROCESS

J. Edward Caster, Ph.D., Claremont Colleges and Scripps College

The history of human thought has been marked at infrequent intervals by a sudden spurt as insight enabled men to gain new information and knowledge of the universe in which they live. This may have followed the invention of a tool or the perfection of an experimental technique. It may have been a transposition in a point of view which gave an altered perspective. Such accelerations in the grasp of knowledge have been the contribution of the genius of one man or of the efforts of many. And they have been more frequently related to problems of the physical sciences than of those areas which deal with man's biology and his social behavior.

The physical sciences have attained a notable preeminence, not only in the mastery of effective experimental techniques but also in the perfection of the conceptual tools which are employed in setting up hypotheses and interpreting experimental results. In contrast the biological sciences have been tardy in defining their problems, in devising valid experimental attacks upon them, and in incorporating their results in a consistent and logical body of information. It is entirely possible that the experimental method as developed in physics is not directly applicable to bio-social problems. The number of uncontrollable variables as well as the number which can only be partially controlled constitutes a serious difficulty. But the impediments of concept formulation are even more serious. Differences in point of view, in fact, the possibility that many varied points of view may coexist, does not make possible a unified planned attack on the most elementary problems.

It is true that there have been several attempts, methodologically, to bridge the gap between the "physical" and the "life" sciences. Mechanistic and mathematical analogies and interpretations are yet not uncommon. Statistical approaches also have their addicts. All of these, however, to date have so stretched scientific scepticism that it appears to many observers to have become mystical credulity. Bare transference of technique from one discipline to another seems fundamentally unproductive.

Now we are hearing of a new approach that endeavors to delve below the distinctive apparatus of the several sciences to a common element.

Within the last decade there has quietly developed a revolution within three fields of thought, philosophy, physics, and psychology. In each field the unrest was independent but as it became more clearly defined it was apparent that there was a common factor of concern, language. Of course language has been a matter of concern since the Greeks but the tremendous growth in prestige and power of science within the last century gives this latest resurgence a peculiar significance. It is directly attributable to the fact that the mechanical techniques of the laboratory have outrun our conceptual tools. With the new vision of the universe made possible by instruments we find that our old conceptual habits cannot be made to fit what we see. A good illustration is provided by the recent perfection of a super-microscope which magnifies in excess of 20,000 diameters. What is revealed on the photographic plate with this instrument is at present beyond our comprehension.

It may be suggested that such an obstruction is only temporary and that shortly some method will appear which will enable us to circumvent it. In one sense this may be true but everywhere the new discoveries of science impinge more and more on the feeble information we have of human nature and the strain is becoming insupportable.

Many struggle to keep science "in its decent place". But the implications are too great for a prolonged compromise of this kind. We are forced inexorably to recognize the problem of human concept formulation and transmission and we face the painful necessity of a general revision of attitudes to which we have clung tenaciously and stubbornly.

To this revolution has tentatively been given the label Scientific Empiricism, and it constitutes the focus of several correlatively converging lines of thought, Logical Positivism, Operationalism, Physicalism, and Semiotic. Space will not permit me to elaborate on the nature and significance of these several contributing factors save to call to attention the common problem, that of the nature and significance of inter-subjective communication.

For many years there has been a growing discontent both in philosophy and in science with the number of sterile pseudo-problems which are common to both disciplines. Such problems may be recognized in many cases as due to bad language habits and they are responsible for enormous wastage of intellectual time and effort. While linguistics and philology have examined certain facets of the problem of language usage, they have not provided adequate information for the type of problems which press with such urgency on philosophers and scientists.

At present this movement consists of little more than an ambitious program of attack. It will involve the revision and in some cases the abandonment of concepts venerable with age and propriety, but the number of mathematicians, philosophers, and psychologists who have shown a commendable willingness to share the intellectual labor involved promises well. Extensive are the polemics which attend the movement and this perhaps is the most hopeful sign. Intellectual ferment is always preferable, I think, to a docile and supine acquiescence in the status quo.

Scientific Empiricism is defended by Dr. C. W. Morris of the University of Chicago, in the thesis that "...it is possible to include without remainder the study of science under the study of the language of science, because the study of that language involves not merely the study of its formal structure but its relation to the objects it designates and to the persons who use it."[1] Dr. Morris is a philosopher and this statement is a philosophical interpretation.

From the laboratory of the physicist comes an interpretation of the <u>concept</u> as it is employed by the scientist. Concepts, it is suggested, which have been of scientific value, can always be identified with a corresponding

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1 Morris, C. W., <u>Foundations of the Theory of Signs</u>

set of operations. This point of view has been vigorously presented by Dr. P. W. Bridgman of Harvard, distinguished for his research on the effects of high pressures upon the organization of matter. An explanation according to Bridgman consists in breaking down a situation into elements by a series of operations to the point where our curiosity rests. But he points out that this can never bring us to exact and certain knowledge. In fact he asserts that "no empirical science can ever make exact statements"[1]. This is a startling line of reasoning if valid, and the implication for those fields of human thought outside of science which make dogmatic fiats is serious, to say the least.

The main task of science, according to Professor Stevens[2], a psychologist of good repute, is "to generate confirmable propositions by fitting a formal system of symbols (language, mathematics, logic) to empirical observations... and such propositions... have empirical significance only when their truth can be demonstrated by a set of concrete operations."

This definition rests upon the assumption that there are two types of propositions. Again from Stevens, "...formal propositions are arrays of symbols without empirical reference. They are language, mathematics, and logic as such. Empirical propositions are those in which these arrays of symbols have been identified with observable events."

These interpretations are addressed at the general problem of how science is made and it is apparent that though we may frequently forget it, science involves essentially and basically a communicative problem. We cannot avoid the implications of such a development for areas of human experience which do not at present come under scientific observation. I think the implications are very great.

Professor Morris[3] suggests that Scientific Empiricism is a study with three levels or dimensions. These are Syntactics, Semantics, and Pragmatics.

Syntactics studies the relation of signs to signs and includes the rules of logic, pure mathematics, and syntax in general. It is suggested that all of us, scientists included, are prone to pile up symbols of symbols without recognition of what we are doing. This leads to the formulation of pseudo-problems and interpretations which do not interpret. Much of our language, perhaps most of it, consists of signs of signs when our intention was to have signs of objects. However the importance of purely formal propositions is not denied. This is obvious in pure mathematics where the elaboration of intricate formulae may precede any empirical use for them. Again it must be recognized that many hypotheses are purely formal propositions. They become empirical only after they are demonstrable. Thus formal propositions become an important exploratory device. According to this view large areas of philosophy consist of formal propositions many of which could never

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1 Bridgman, P.W., The Logic of Modern Physics
2 Stevens, S. S., Psychology and the Science of Science
3 Morris, C. W. ibid.

become empirical.

Semantics studies the relation of signs to objects or essentially the relations which exist between formal and empirical terms and propositions to the various aspects of our discriminable world. What are the rules which define this relationship? How are they violated in discourse? What are the actual conditions under which signs are employed? These are sample questions which Semantics seeks to answer.

Pragmatics covers the study of the relation of signs to those who employ them. This is, of course, a primary problem of psychology. We acquire, for instance, reaction habits to constellations of signs which bear relation to the reaction habits we have formed to the objects and situations which the signs represent. This is a problem which is especially pertinent at the moment since it involves the psychology of propaganda.

A former Polish nobleman, Count Alfred Korzybski has inspired an impressive following in this country with the thesis that much of human maladjustment is attributable to faulty language habits. Unfortunately this group is developing the symptoms of a cult and while it may be true that many of the neuroses and psychoses are caused by spurious sign reactions, it does not seem wise to set up a pretentious therepeutic program until the real problems of sign usage have been thoroughly explored.

The movement which I have briefly outlined has emerged as a rather specific attack upon the nature of the conceptual tools employed in philosophy and science. As I have already suggested the implications for the general problem of intersubjective communication are not yet clear. In his recent How to Read a Book Mortimer Adler faces a problem which is close to the interests of every teacher and student. He submits impressive evidence, gleaned from many sources, that few of us comprehend much of what we read. He attributes this to many factors most of which he thinks are remediable. He criticizes the semanticians , (I am uncertain as to just whom he means) rather caustically. He accuses them of being a group of individuals who are poor readers. To him therefore semantics is a rationalization. The fault is not with the writer but with the reader. I think the problem is more serious and far more basic than this. Our word habits are usually taken for granted. Rarely, if ever, are they examined in the educational procedures we have set up. Probably the real difficulty which Adler so clearly exposes is as usual our educational system and not entirely as he would have us believe, with the reader.

Since I am not a philosopher but a biologist, and since psycho-biology considers intersubjective communication as one of its major problems it might be useful to sketch in rough outline certain fundamental assumptions which have been fruitful in this field. It is my conviction that the dislocation created in scientific knowledge by the tardiness of biology to emerge from a purely descriptive or taxonomic level is largely responsible for the relative ineffectiveness of the bio-social sciences as described earlier in this essay. In a very real sense biology is a prior science. Philosophers, scientists, teachers, students, even semanticians, are biological organisms and as such

have a common denominator. All human activity may be observed as forms of biological adaptation, distorted and involved as it may become. Until biologists have assumed the important obligation of working out much of human activity in forms of biological adjustment, conclusions as to what human organisms are doing in specific and general situations will be immature.

How does psychobiology approach the problem of communication? It has set up a working hypotheses which has been vigorously attacked by experimentation and which up to the present at least, has borne abundant fruit. Essentially the hypothesis asserts the absolute privacy of individual human experience, all believers in thought-transference and extra sensory perception notwithstanding. Each individual is strictly dependent for his information about another individual's experience, either from cues gained from observations of that individual's behavior, or, from the reactions to some kind of intermediary, sign, or symbol, employed by the "other one" as surrogates of his private experience.

The primary, and undoubtedly the more primitive, type of communication will include all activities of the human body,- independent of tools, agents, devices, or paraphernalia, - which serve with or without intention as meaningful to an observer. Such meaning, thus derived, may be invalid in the sense that for some reason bodily activity does not accurately or adequately convey the experience, or because of faulty reference on the part of the observer. Such situations may arise from intentions to dissemble or from institutional variations characteristic of different cultures. Primary communication of this type is common with animals although we have no possible way of checking its validity. Our inveterate tendency to anthromorphize has made the whole approach to animal behavior a precarious one on any other than a strictly behaviористic interpretation. Cues of the primary type are by their nature transitory but capable of transmission from generation to generation by overlap. Included in this category are facial expressions, gestures, speech, body-postures, etc. They are manifestations of the intense socialization of behavior and in general will be comparable from one human group to another because of the intimacy with which they are tied to the anatomical and physiological factors which are their agents of expression.

The second and much more elaborate and extensive technique of communication will include any and all modifications effected by man upon his material environment which have meaning for his fellows or for him. This supreme accomplishment of evolution has made man a "time-binding" animal. It is attributed to the remarkable development of the cerebral cortex and to the structures which were evolved concurrently with it. It has made possible the direct manipulation of the material environment in a manner far suppassing that possible for any other member of the primate group. It involves the utilization of tools, devices, apparatus and paraphernalia as well as direct manipulation, and includes within its category the graphic and plastic arts, musical notations, written language, and all of the furniture of our culture. In some degree all of the evidences of man's existence on this earth independent of man himself would be included in this form of intersubjective communication.

Within the general setting of the problem of communication reading may

be described as a series of reactions to sign stimuli which serve as cues for mental and emotional activity as the result of verbal conditioning. If the primary assumptions of Scientific Empiricism have any validity there follow certain implications for reading:

1. Abstractions and generalities (symbols of symbols) have no educative validity unless the learner has knowledge of the steps by which such abstractions and generalities were derived (to what objects the symbols genetically trace). It would seem apparent that the reader will gain in apprehension if he has had some training in the etymology of words. The lack of such training is conspicuous in our educational procedures.

2. It is essential that preoccupation with the characteristics of words in themselves be not confused with the relation of words to the objects they represent. Such preoccupation leads to verbal intoxication so conspicuous in political and sentimental writing. The "most beautiful words" owe much of their appeal to factors quite irrelevant to the objects they represent.

3. Words in themselves have tremendous potentialities for dislocating us with reality. In extreme form we can witness this process in the insane asylum but in more subtle forms we are all subject to verbal defenses or rationalizations.

4. Words easily acquire and retain a fetich value. This is apparent in religious and political rituals and in extreme form has not apparently evolved far from the verbal incantations of primitive magic.

5. The written word enjoys a peculiar sanctity. To describe it in another way a book acquires a certain validity quite independent of the experiences for which the written words are symbolic. For this reason many folk cherish books for their own sake and not because of their human significance.

6. Most of the subject matter of serious books consist of formal propositions for which no operational processes have been worked out. For that reason they will present assertions or assumptions which should be recognized as such and not confused with tested knowledge.

7. It would seem advisable to cultivate in one's reading habits the alertness to distinguish formal from empirical propositions to the end that a clearer apprehension may be had of what the writer actually seeks to transmit.

VISUAL SURVEY, ALHAMBRA SCHOOL DISTRICT, ALHAMBRA, CALIFORNIA

M. R. Stokesbary, M.S., Assistant Superintendent, Director of Research, Alhambra School District and Maurice M. Dalton, O.B., Opt.D., Optometric Eye Specialist.

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PREFACE

The visual survey, of which this is a report, began in January, 1938 when the Alhambra School District through its Board of Education and Mr. G. E. Gettinger, Superintendent, authorized a visual survey of all the children attending the public schools within the district.

Upon the completion of the tests with their accumulated data the writer was offered the opportunity of analysing the data and suggesting a method of breakdown which would be coherent to the Educator, Eye Specialist, or others interested in this type of survey.

We are indebted to Dr. H. L. Fuog, for many valuable suggestions in outlining the breakdown.

#

INTRODUCTION

Facts vs. Speculation

If you were asked the question, "Just what is the relationship between normal vision or defective vision and scholastic achievement", how would you answer it? Yes, we know. That is exactly what our answer was, and most emphatic too.

But to insist that scholastic achievement requires a normal visual apparatus would be basing our judgement on facts by inference only, to wit: Scholastic achievement requires study and in turn an immense amount of reading; hence defective vision results in handicapped reading and as a consequence, poor scholarship.

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Optometrists, like other people, are only too prone to speculate and base their theories on facts by inference only. A theory should also be confirmed with facts by observation if possible.

The writer was given the opportunity to investigate the above question through the courtesy of the Director of Research, Alhambra School District, Mr. Stokesbary, who suggested that we cooperate with him by suggesting a breakdown of the visual survey and an analysis of the findings.

This survey and breakdown include more complete data than has been collected previously on a large group of similar subjects, and furnishes, perhaps, the best opportunity ever provided to answer the question we have posed at the beginning of this chapter.

The Project

In the spring of 1938 the Board of Education through its superintendent, Mr. Geo. E. Bettinger, authorized a visual survey of all children attending the public schools within the Alhambra School District.

Objective

(1) To ascertain the visual condition of the pupils in general.
(2) To find out if possible any relationship which might exist between Visual Deficiencies and Scholarship.
(3) Once a complete survey has been made it is a simple matter to keep the records up to date by checking each entrance class in the kindergarten and the pupils who transfer; this work being done by the local school staff at a fraction of the expense of the original survey, yet a permanent record of the visual anomalies of each pupil is ready for reference.

Funds

A grant of funds to carry on the work was obtained from the W.P.A.

Personnel

The personnel was obtained from the W.P.A. lists of persons whose qualifications seemed to be apt for the purpose of the survey.

Training

The personnel was trained under the personal supervision of Mr. Stokesbary and a representative of the Keystone View Company of Meadville, Pa.

Instruments

For the purpose of the survey two Telebinoculars were purchased

complete with test cards etc. from the Keystone View Company, Meadville, Pa.

TESTS

The survey consisted of a battery of twelve tests known as the "Betts Visual Tests" all made with the Telebinocular, a plus lens, minus prism stereoscope.

1. An introductory test to acquaint the child with the general nature of the tests to follow. It consists of a picture of a dog holding a hoop in his mouth through which a pig is jumping.

2. Distant Fusion (Far Point). Consists of four colored dots in two verical columns which, when fused result in one column of three dots.

3. Visual Efficiency (Acuity) a. Both eyes; b. left eye; c. right eye. Consists of targets set at different distances in a landscape. Target consists of a black field with five white diamonds set in the form of a cross, in each target the cross carries a single dot in one of the diamonds.The dot varies in position with each target.

4. Vertical Imbalance (Taken at infinity only). Consists of a horizontal line in front of the left eye and a vertical column, consisting from the top down of a square, cross, ball with a black dot, diamond, and star.

5. Coordination Level (Stereopsis). Consists of a target with ten rows of black characters, five to the row on a white field. In each row only one character stands out in stereopsis. Readings are in percent, 10% for each row, 100% in all.

6. Lateral Imbalance. a. At far point; b. at near point. Consists of a target with an arrow in front of the left eye and a row of numbers from one to fifteen inc. in front of the right eye. The position of the arrow in relation to the numbers indicates the imbalance and its nature.

7. Fusion at Near Point. Consists of four colored dots in two vertical columns which, when fused result in one column of three dots. In this test the two vertical columns are set closer together than in test # 2 to compensate for the increased nearness of the target.

8. Sharpness of Image (Ametropia) a. Near point; b. far point . This test is designed to catch errors of focus or ametropia but does not identify the nature of the trouble such as nearsightedness, farsightedness, etc. It is based upon the ability of the eye to distinguish the number of lines on a series of twelve golden balls, said lines being of a minimum separation and varying in number and angular direction. The test is made at both far and near point.

All the above tests were made according to Telebinocular procedure.

With reference to the above statement it might not be amiss to recall to the mind of the reader that all plus lens stereoscopes have minus (Base out) prisms incorporated with the lenses to help the eyes superimpose the two images which results in singular binocular vision.

In accomplishing the above, the stereoscope sets up an artificial condition about the visual act which may or may not invalidate a given test.

First, no matter what combination of lenses and prisms used, the person being tested can not escape from "The Awareness of Nearness" of the target.

Second, while the plus lenses may inhibit or relax accomodation for a given point there is still the possibility of a stimulus to accommodation through convergence via the minus (base out) prisms.

Third, due to the above facts optometrists as a general rule never use stereoscopic findings in writing a prescription; especially one for a muscular imbalance which stereoscopic tests are prone to greatly exaggerate.

In reference to the last statement, a fuller discussion will occur in the summary and conclusion when discussing tests # 2 and # 7.

Subjects

The group of this survey was composed of 5821 students of the Alhambra School District, Grade 3A and above, and are subdivided as follows:

Elementary School Students		2729
High School Students	(Girls)	1511
	(Boys)	1581
	Total	5821

Note

In some cases the sequence of the tests as outlined has been changed to facilitate comparison.

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RESULTS OF ALHAMBRA VISUAL SURVEY

TABLE I
ELEMENTARY

Number Perfect and Number Deficient

Number Tested	No. Per./No.W 1	No.W 2	No.W 3	No.W 4	No.W 5	No.W 6	No.W 7	No.W 8	No.W 9	No.W 10	No.W 11	No.W 12
2729	479	648	579	406	298	162	86	37	15	11	6	1	1
%	17.6	23.7	21.2	14.9	10.9	5.9	3.2	1.4	.55	.40	.22	.04	.04

Indicates number and percent of perfect scores and failures per test and is to be read as follows:

479 or 17.6% made perfect scores in all 12 tests.
648 or 23.7% failed in one test.
579 or 21.2% failed in two tests, etc.
Only 1 or .04% failed in all twelve tests.

TABLE II
HIGH SCHOOL BOYS AND GIRLS

Number Perfect and Number Deficient

Number Tested	No. Per./No.W 1	No.W 2	No.W 3	No.W 4	No.W 5	No.W 6	No.W 7	No.W 8	No.W 9	No.W 10	No.W 11	No.W 12
3092	370	544	638	587	408	273	141	73	23	17	12	3	3
%	12.	17.6	20.6	19.	13.2	8.8	4.6	2.4	.74	.55	.39	.097	.097

To be interpreted the same as Table I.

TABLE III
HIGH SCHOOL BOYS

Number Perfect and Number Deficient

Number Tested	No. Per./No.W 1	No.W 2	No.W 3	No.W 4	No.W 5	No.W 6	No.W 7	No.W 8	No.W 9	No.W 10	No.W 11	No.W 12
1581	153	275	359	319	232	134	61	27	10	3	7	1
%	9.7	17.4	22.7	20.2	14.7	8.5	3.9	1.7	.63	.19	.44	.06

To be interpreted the same as Tables I and II

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TABLE IV
HIGH SCHOOL GIRLS

Number Perfect and Number Deficient

Number Tested	No. Per.	No. W/No. 1	No. W/No. 2	No. W/No. 3	No. W/No. 4	No. W/No. 5	No. W/No. 6	No. W/No. 7	No. W/No. 8	No. W/No. 9	No. W/No. 10	No. W/No. 11	No. W/No. 12
1511	217	269	279	268	176	139	80	46	13	14	5	2	3
%	14.4	17.8	18.5	17.8	11.6	9.2	5.3	3.0	.86	.93	.33	.13	.20

To be interpreted the same as Tables I, II and III

TABLE V

TEST # 1
Introductory
ELEMENTARY

No. Tested	Normal	Failed
2729	2724	5
%	99.8	.18

TABLE VI

TEST # 1
HIGH SCHOOL GIRLS

No. Tested	Normal	Failed
1511	1504	7
%	99.5	.46

TABLE VII

TEST # 1
HIGH SCHOOL BOYS

No. Tested	Normal	Failed
1581	1575	6
%	99.6	.38

TABLE VIII

TEST # 2
Far Point Fusion
ELEMENTARY

No. Tested	Normal	Doubtful	Failed
2729	1689	605	435
%	61.9	22.2	15.9

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TABLE IX

TEST # 2
HIGH SCHOOL GIRLS

No. Tested	Normal	Doubtful	Failed
1511	975	201	335
%	64.5	13.3	22.1

TABLE X

TEST # 2
HIGH SCHOOL BOYS

No. Tested	Normal	Doubtful	Failed
1581	941	383	257
%	59.5	24.2	16.2

TABLE XI

TEST # 7
Near Point Fusion
ELEMENTARY

No. Tested	Normal	Doubtful	Failed
2729	1699	598	432
%	62.3	21.9	15.8

TABLE XII
HIGH SCHOOL GIRLS

No. Tested	Normal	Doubtful	Failed
1511	983	234	294
%	65.0	15.4	19.5

TABLE XIII

TEST # 7
HIGH SCHOOL BOYS

No. Tested	Normal	Doubtful	Failed
1508	930	400	251
%	58.8	25.3	15.9

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TABLE XIV

TEST # 3-A
Visual Acuity Both Eyes
ELEMENTARY

Number Tested	0:20%	30%	40%	50%	60%	70%	80%	90%	100%	105%	110%
2729	2		3	6	13	18	46	241	1859	528	13
%	.07		.11	.22	.5	.66	1.7	8.8	68.1	19.4	.47

TABLE XV

TEST # 3-A
HIGH SCHOOL GIRLS

Number Tested	0:20%	30%	40%	50%	60%	70%	80%	90%	100%	105%	110%
1511		1	6	3	16	17	33	174	869	386	1
%		.06	.39	.19	1.05	1.12	2.18	11.8	57.5	25.5	.06

TABLE XVI

TEST # 3-A
HIGH SCHOOL BOYS

Number Tested	0:20%	30%	40%	50%	60%	70%	80%	90%	100%	105%	110%
1581			1L	1L	10	10	23	89	788	656	3
%			.06	.06	.63	.63	1.45	5.6	49.8	41.5	.19

TEST XVII

TEST # 3-B
Visual Acuity Left Eye Only
ELEMENTARY

Number Tested	0:20%	30%	40%	50%	60%	70%	80%	90%	100%	105%	110%
2729	17	5	6	8	3	24	78	125	302	1886	275
%	.62	.18	.22	.29	.11	.88	2.9	4.58	11.1	69.1	10.1

TABLE XVIII

TEST # 3-B
HIGH SCHOOL GIRLS

Number Tested	0	20%	30%	40%	50%	60%	70%	80%	90%	100%	105%	110%
1511	10	1	8	9	3	28	63	70	235	900	184	
%	.66	.06	.53	.59	.19	1.85	4.17	4.63	15.5	59.5	12.1	

TABLE XIX

TEST # 3-B
HIGH SCHOOL BOYS

Number Tested	0	20%	30%	40%	50%	60%	70%	80%	90%	100%	105%	110%
1581	7	3	4	8	7	20	44	88	138	1008	253	1
%	.44	.19	.25	.51	.44	1.3	2.8	5.6	8.7	63.8	16.0	.06

TABLE XX

TEST # 3-C
Visual Acuity Right Eye Only
ELEMENTARY

Number Tested	0	20%	30%	40%	50%	60%	70%	80%	90%	100%	105%	110%
2729	8	4	4	24	10	30	18	83	344	1870	330	4
%	.29	.15	.15	.88	.37	1.1	.66	3.4	12.6	68.4	12.1	.15

TABLE XXI

TEST # 3-C
HIGH SCHOOL GIRLS

Number Tested	0	20%	30%	40%	50%	60%	70%	80%	90%	100%	105%	110%
1511	8		4	19	12	13	18	52	243	928	214	
%	.53		.26	1.25	.79	.86	1.19	3.44	16.1	61.4	14.2	

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TABLE XXII

TEST # 3-C
HIGH SCHOOL BOYS

Number Tested	0:	20%:	30%:	40%:	50%:	60%:	70%:	80%:	90%:	100%:	105%:	110%
1561	3	1	2	10	12	21	13	38	178	970	329	4
%	.19	.06	.13	.63	.76	1.33	.82	2.4	11.3	61.4	20.8	.25

TABLE XXIII

TEST # 4
Vertical Imbalance at Far Point
ELEMENTARY

No. Tested	Normal	Doubtful	Failed
2729	2654	38	37
%	97.3	1.4	1.4

TABLE XXIV

TEST # 4
HIGH SCHOOL GIRLS

No. Tested	Normal	Doubtful	Failed
1511	1454	21	36
%	96.2	1.4	2.4

TABLE XXV

TEST #4
HIGH SCHOOL BOYS

No. Tested	Normal	Doubtful	Failed
1561	1537	14	30
%	97.2	.89	1.9

TABLE XXVI

TEST # 5
STEREOPSIS
ELEMENTARY

Number Tested	0:	10%:	20%:	30%:	40%:	50%:	60%:	70%:	80%:	90%:	100%
2729	59	15	11	10	5	4	79	89	40	105	2312
%	2.2	.55	.40	.37	.18	.15	2.9	3.3	1.5	3.9	84.6

TABLE XXVII

TEST # 5
HIGH SCHOOL GIRLS

Number Tested	0:	10%:	20%:	30%:	40%:	50%:	60%:	70%:	80%:	90%:	100%
1511	94	4	10	5	6	3	80	140	48	123	998
%	6.22	.26	.66	.33	.39	.19	5.3	9.3	3.2	8.14	66.04

TABLE XXVIII

TEST # 5
HIGH SCHOOL BOYS

Number Tested	0:	10%:	20%:	30%:	40%:	50%:	60%:	70%:	80%:	90%:	100%
1581	52	8	19	4	5	3	82	125	40	81	1162
%	3.3	.51	1.2	.25	.32	.19	5.2	7.9	2.5	5.12	73.5

TABLE XXIX

TEST # 6-A
Lateral Imbalance at the Far Point
ELEMENTARY

No. Tested	Normal	Doubtful	Failed
2729	2603	25	101
%	95.4	.91	3.7

TABLE XXX

TEST #6-A
HIGH SCHOOL GIRLS

No. Tested	Normal	Doubtful	Failed
1511	1451	2	58
%	96.0	.13	3.83

TABLE XXXI

TEST # 6-A
HIGH SCHOOL BOYS

No. Tested	Normal	Doubtful	Failed
1581	1508	8	65
%	95.3	.51	4.1

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TABLE XXXII

TEST # 6-B
Lateral Imbalance at the Near Point
ELEMENTARY

No. Tested	Normal	Doubtful	Failed
2729	2539	46	145
%	93.0	1.7	5.3

TABLE XXXIII

TEST # 6-B
HIGH SCHOOL GIRLS

No. Tested	Normal	Doubtful	Failed
1511	1424	7	80
%	94.2	.46	5.3

TABLE XXXIV

TEST # 6-B
HIGH SCHOOL BOYS

No. Tested	Normal	Doubtful	Failed
1581	1445	39	97
%	91.4	2.5	6.1

TABLE XXXV

TEST # 8-A
Ametropia
Near Point Left Eye
ELEMENTARY

Number Tested	0	1	2	3	4	5	6
2729	2656	36	8	10	6	4	12
%	97.2	1.3	.29	.37	.22	.15	.44

TABLE XXXVI
TEST # 8-A
HIGH SCHOOL GIRLS

Number Tested	0	1	2	3	4	5	6
1511	1468	13	7	10	3	4	6
%	97.1	.86	.46	.66	.19	.24	.39

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TABLE XXXVII

TEST # 8-A
HIGH SCHOOL BOYS

Number Tested	0	1	2	3	4	5	6
1581	1560	7	4	3	1	1	5
%	98.7	.44	.25	.19	.06	.06	.32

TABLE XXXVIII

TEST # 8-A
Ametropia
Near Point Right Eye
ELEMENTARY

Number Tested	0	1	2	3	4	5	6
2729	2651	33	12	12	4	6	11
%	97.1	1.2	.44	.44	.15	.22	.40

TABLE XXXIX

TEST # 8-A
HIGH SCHOOL GIRLS

Number Tested	0	1	2	3	4	5	6
1511	1457	17	14	6	8	4	5
%	96.4	1.12	.92	.39	.53	.26	.33

TABLE XL

TEST # 8-A
HIGH SCHOOL BOYS

Number Tested	0	1	2	3	4	5	6
1581	1559	14	2	2	2		2
%	98.6	.89	.13	.13	.13		.13

TABLE XLI

TEST #8-B
Ametropia
Far Point Left Eye
ELEMENTARY

Number Tested	0	1	2	3	4	5	6
2729	2322	143	103	63	38	26	34
%	85.1	5.2	3.8	2.3	1.4	.95	1.3

TABLE XLII

TEST # 8-B
HIGH SCHOOL GIRLS

Number Tested	0	1	2	3	4	5	6
1511	1088	110	95	63	50	32	73
%	72.0	7.3	6.3	4.2	3.3	2.1	4.8

TABLE XLIII

TEST # 8-B
HIGH SCHOOL BOYS

Number Tested	0	1	2	3	4	5	6
1581	1337	86	69	35	23	13	18
%	84.6	5.4	4.4	2.2	1.5	.82	1.1

TABLE XLIV

TEST # 8-B
Ametropia
Far Point Right Eye
ELEMENTARY

Number Tested	0	1	2	3	4	5	6
2729	2274	178	101	57	35	36	48
%	83.3	6.5	3.7	2.1	1.3	1.3	1.8

TABLE XLV

TEST # 8-B
HIGH SCHOOL GIRLS

Number Tested	0	1	2	3	4	5	6
1511	1073	105	87	77	54	27	83
%	71.3	7.0	5.75	5.09	3.6	1.8	5.5

TABLE XLVI

TEST # 8-B
HIGH SCHOOL BOYS

Number Tested	0	1	2	3	4	5	6
1581	1314	104	78	47	14	11	13
%	83.1	6.6	4.9	3.0	.89	.70	.82

THE BREAKDOWN

When requested to suggest a breakdown of the survey material, the writer was assisted in outlining the following questions by Dr. H. L. Fuog.

First, what will be shown by comparing the defectives with normals by averages in:

Grade Placement
- Above (Boys
- Above (Girls
- Below (Boys
- Below (Girls

Reading
- Vocabulary (Boys
- Vocabulary (Girls
- Comprehension (Boys
- Comprehension (Girls

I.Q. (Boys
(Girls

Biotypes (Boys
(Girls

The answer to this question is in Tables XLVII and XLVIII.

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TABLE XLVII

Comparison of Defectives to Normals by Averages

	(Grade		)	Read.	Read.		(Biotypes		)
	Place.	Above	Below	Voc.	Comp.	I.Q.	Manual	Mental	Equal
(Girls) Total (210)									
Deficient Average	5.8	1.0	.1	6.1	6.1	110	.3	.6	.09
Total (90) Normal Average	5.5	.9	.1	6.0	5.9	110	.3	.5	.07

The average Grade placement of the defectives is 5.8, while the normals is 5.5 or three months behind the defectives. The range is from 10 months above to 1 month below for defectives, and for normals 9 months above to 1 month below.

Reading vocabulary is more equal; 6.1 for defectives and 6.0 for normals.

Reading comprehension; 6.1 for defectives and 5.9 for normals.

The average I. Q. for both defectives and normals is equal, 110.

Biotyping indicates that there is a definite trend to mental activities by both defectives and normals among girls, although the normals show a slight trend to the manual or muscular side.

TABLE XLVIII

Comparison of Defectives to Normals by Averages

	(Grade		)	Read.	Read.		(Biotypes		)
	Place.	Above	Below	Voc.	Comp.	I. Q.	Manual	Mental	Equal
(Boys) Total (251)									
Deficient Average	5.6	.7	.3	6.3	6.0	105	.4	.4	.08
Total (115) Normal Average	5.5	.8	.2	5.6	5.8	107	.4	.3	.09

The average grade placement for defectives is 5.6, or six months in the fifth grade. The range is from seven months above, to three below the average.

The average grade placement for normals is 5.5, or one month behind the defectives, and the range is from eight months above to two months below the average.

Reading in this district is divided into Reading Vocabulary and Reading Comprehension.

The defectives show an average Reading Vocabulary of 6.3, while the normals show an average of 5.6 or seven months less than the defectives.

In Reading Comprehension the variation in favor of the defectives is only two months, from 5.8 to 6.0.

The average I. Q. favors the normals 107 to 105. In biotyping the defectives appear to be about equally divided between the manual or muscular type and the mental type. The normals show a slight leaning to the manual type, .4 to .3. It has been suggested that the above may be due to Athletics and Vocational or Manual training.

<u>Second</u>, what is the percentage of defectives to normals in

Grade Placement	Above		Boys
	Below	Above	Girls
Reading	Vocabulary		Boys
		Below	Girls
	Comprehension		Boys
		Above	Girls
Passing and Failing			Boys
		Below	Girls
			Boys
		Passing	Girls
			Boys
		Failing	Girls

The answer to this question is in Tables XLIX and L.

TABLE XLIX
Percentage of Defectives to Normals

	Normal Grade Place. Above	Below	G.P. Read. Voc. Above	Below	G.P. Read. Comp. Above	Below	Failures Fail	Pass	Accel.
(Boys)									
Total (247)	161	87	174	72	176	74	46	191	9
Deficient									
Percentage	65.2	35.2	70.4	29.1	71.3	30.	18.6	77.3	3.6
Total (114)	79	35	80	34	79	35	29	77	7
Normal									
Percentage	69.2	30.7	70.2	29.8	69.3	30.7	25.4	76.5	6.1

This table would indicate that normals have a larger percentage above grade placement than the defectives, but as we come to Reading Vocabulary and Reading Comprehension we find the percentage slightly in favor of the defectives, and in the question of advancement in grade we find the percentage distinctly in favor of the defectives.

TABLE L
Percentage of Defectives to Normals

	Normal Grade Place. Above	Below	G. P. Read. Voc. Above	Below	G. P. Read. Comp. Above	Below	Failures Fail	Pass	Accel.
(Girls)									
Total (210)	173	37	169	41	180	30	19	175	16
Deficient									
Percentage	82.4	17.6	80.5	19.5	85.7	14.2	9.	83.3	7.6
Total (90)	77	13	80	10	78	12	7	78	5
Normal									
Percentage	85.6	14.4	88.9	11.1	86.7	13.3	7.8	86.7	5.6

In this table the percentage is all in favor of the normals. The defectives show no advantage in Reading Vocabulary and Reading Comprehension as indicated in Table XLIX.

Third, with what frequency does Vertical Imbalance occur per thousand cases, and what is the relation of hyperphoria to hypophoria? The answer to the above question appears in Table LI.

TABLE LI
TEST #4
Vertical Imbalance

Number Tests	Defective Cases	Cases Above	Cases Below	Total Cases
1000	21	8	13	21
	Percentage	.8%	1.3%	2.1%

This would indicate that vertical imbalance occurs with a frequency of about 21 per thousand.

Fourth, what is the correlation of stereopsis (depth vision) to I. Q. in girls? in boys? The answer to this question is in Tables LII to LV.

TABLE LII
Correlation of Stereopsis to I. Q.
(Girls)

RECAPITULATION OF
200 CASES TESTED

	Stereo. Level	I.Q.	Read. Voc.	Read. Comp.	Grade Place.	Biotype Manual	Biotype Mental	Biotype Equal
Average	92.	110.7	6.2	6.2	5.8	.3	.6	.1

Showing a recapitulation of 200 cases to be used in determining if a relationship exists between Stereopsis and I.Q. The average stereopsis level is 92. for the 200 cases.

TABLE LIII
Calculation of Co-efficient Stereopsis to I.Q.
(Girls)

Correlation of:

	Stereopsis Level (0 to 100)				x'y'	
	Fy	Dy	FDy	FD^2y	Plus	Minus
I.Q. Range (60 to 159)						
Fx	200		121	516	211	145
					(Plus	66)
Dx						
FDx	46					
FD^2x	866					

cy $\frac{121}{200}$ eq. .60 cx $\frac{46}{200}$ eq. .23

C^2y .36 C^2x .529

Cy 6.00 Cx 2.3

$y/\frac{516}{200} - .360$ $x/\frac{866}{200} - .529$

y eq 1.49 x 10 eq 14.90 x eq 1.95 x 10 eq 19.50

Calculation of r:

$$r \quad \frac{\frac{66}{200} - (.60 \times .23)}{1.49 \times 1.95} \quad \text{eq} \quad \frac{.16}{2.90}$$

r equals .06

Showing a correlation co-efficient of .06 which is too small to be of any significance.

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TABLE LIV
Correlation of Stereopsis to I. Q.
(Boys)

RECAPITULATION OF
200 CASES TESTED

	Stereo. Level	I.Q.	Read. Voc.	Read. Comp.	Grade Place.	(Biotype Manual	Mental	) Equal
Average	89.7	105.7	6.1	6.1	5.7	.5	.4	.07

Showing a recapitulation of 200 cases to be used in determining if a relationship exists between Stereopsis and I. Q. Average stereopsis level is 89.7 for the 200 cases.

TABLE LV
Calculation of Co-efficient Stereopsis to I.Q.
(Boys)

Correlation of:	Stereopsis Level (0 to 100)			x'	y'
	Fy	Dy	FD^2y	Plus	Minus
I.Q. Range (60 to 159)					
Fx	200	20	500	185 (-60)	245
Dx					
FDx	-7				
FD^2x	1275				

cy $\frac{20}{200}$ eq .1

C^2y eq .1

Cy eq 1.0

$y/\frac{500}{200} - .1$

y eq 1.56 x 10 eq 15.60

cx $\frac{-7}{200}$ eq -.035

C^2x eq -.0012

Cx eq -.350

$x/\frac{1275}{200} - -.0012$

x eq 2.52 x 10 eq 25.20

Calculation of r:

$$r \quad \frac{\frac{-60}{200} - (.1 \times -.035)}{1.56 \times 2.52} \text{ eq } \frac{-.23}{3.93}$$

r equals -.60

Again we find our correlation co-efficient to be too small to be of any significance.

Fifth, what is the correlation of Phoric Posture to I.Q. in boys? girls? The answer to this question is in Tables LVI to LXIII.

(Note:) Phoric Posture is the algebraic sum of the phorias at the near point and the far point, Esophoria taken as minus, and Exophoria taken as plus.

TABLE LVI

Lateral Imbalance (Phoria) at far Point

DISTRIBUTION OF
500 TEST CASES
(Boys)

	Plus						Normal					Minus			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Boys 500 Cases	0	0	1	2	5	25	169	189	72	22	4	5	2	2	2
%			.2	.4	1.	5.	33.8	37.8	14.4	4.4	.8	1.	.4	.4	.4

TABLE LVII

Lateral Imbalance (Phoria) at far Point

DISTRIBUTION OF
500 TEST CASES
(Girls)

	Plus						Normal					Minus			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Girls 500 Cases	0	1	0	1	4	20	156	200	83	18	11	1	1	2	2
%		.2		.2	.8	4.	31.2	40.	16.6	3.6	2.2	.2	.2	.4	.4

TABLE LVIII

Lateral Imbalance at Near Point

DISTRIBUTION OF
500 TEST CASES
(Boys)

	Plus		Normal				Minus								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Boys 500 Cases	13	27	130	157	114	40	9	8	0	1	1	0	0	0	0
%	2.6	5.4	26.	31.4	22.8	8.	1.8	1.6		.2	.2				

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TABLE LIX
Lateral Imbalance at Near Point

DISTRIBUTION OF
500 TEST CASES

	Plus		Normal				Normal			Minus					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Girls	4	26	103	172	120	47	17	8	1	0	1	0	0	1	0
500 Cases %	.8	5.2	20.6	34.4	24.	9.4	3.4	1.6	.2		.2			.2	

TABLE LX
Recapitulation of 500 Cases Tested
(Boys)

Test 6-A Far Point	Average	Test 6-B Near Point	Average	Posture Algebraic Sum of b & c	Average
b		c		d	
Plus 34	.07	Plus 44	.09	Plus 59	.12
Minus 11	.02	Minus 18	.04	Minus 18	.04

Plus 41 divided by
77 cases, equals .53
Plus as average posture

TABLE LXI
Recapitulations of 500 Cases Tested
(Girls)

Test 6-A Far Point	Average	Test 6-B Near Point	Average	Posture Algebraic Sum of b & c	Average
b		c		c	
Plus 28	.06	Plus 36	.07	Plus 52	.10
Minus 10	.02	Minus 26	.05	Minus 28	.06

Plus 24 divided by
80 cases equals .30
Plus as average posture.

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TABLE LXII
Correlation of Phoric Posture to I.Q.
(Boys)

Correlation of:	Phoric Posture (Minus 12 to Plus 12)					
					x'y'	
I. Q. Range (60 to 159)	Fy	Dy	FDy	FD^2y	Plus	Minus
Fx	73		11	195	30	47 (-17)
Dx						
FDx	.31					
FD^2x	.177					

cy $\frac{11}{73}$ eq .15
C^2y .0225
Cy .150

$y/\frac{195}{73} - .0225$
y eq 1.627 x 10 eq 16.27

cx $\frac{31}{73}$ eq .42
C^2x .1764
Cx .84

$x/\frac{177}{73} - .1764$
x eq 1.5 x 2 eq 3.00

Calculation of r:

$$r \quad \frac{\frac{-17}{73} - (.15 \times .42)}{1.627 \times 1.5} \quad \text{eq } \frac{-0.29}{2.44}$$

r equals -.12

Phoric posture is the algebraic sum of the Lateral Imbalance (Phoria) at the far and near points. Esophoria considered as minus, and exophoria as plus

TABLE LXIII
Correlation of Phoric Posture to I.Q.
(Girls)

Correlation of:	Phoric Posture (Minus 12 to Plus 12)					
					x'y'	
I.Q. Range (60 to 159)	Fy	Dy	FDy	FD^2y	Plus	Minus
Fx	76		44	200	85	40 (Plus 45)
Dx						
FDx	19					
FD^2x	.193					

cy $\frac{44}{76}$ eq .58
C^2y .3364
Cy .580

$y/\frac{200}{76} - .3364$
y eq 1.51 x 10 eq 15.10

cx $\frac{19}{76}$ eq .25
C^2x .0625
Cx .50

$x/\frac{193}{76} - .0625$
x eq 1.56 x 2 eq 3.12

Calculation of r:

$$r \quad \frac{\frac{45}{76} - (.58 \times .25)}{1.51 \times 1.58} \quad \text{eq } \frac{.44}{2.88}$$

r equals .15

Sixth, what is the correlation of Phoric Posture to Reading Vocabulary in boys? in girls? The answer to this question is in Tables LXIV and LXV.

TABLE LXIV

Correlation of Phoric Posture to Reading Vocabulary (Boys)

Correlation of:	Phoric Posture (Minus 12 to Plus 12)					
					x'y'	
	Fy	Dy	FDy	Fd^2y	Plus	Minus
Reading Vocabulary (2 to 10.9)						
Fx	54		10	186	41	50
Dx						(-9)
FDx	27					
Fd^2x	131					

cy $\frac{10}{54}$ eq .185 cx $\frac{27}{54}$ eq .5

C^2y .0342 C^2x .25

Cy 1.85 Cx .10

$y/\frac{186}{54} - .0342$ $x/\frac{131}{54} - .25$

y eq 1.84 x 10 eq 18.40 x eq 1.47 x 2 eq 2.94

Calculation of r: $r \frac{-\frac{9}{54} - (.185 \times .5)}{1.84 \times 1.47}$ eq $\frac{-.07}{2.70}$ r equals -.003

TABLE LXV

Correlation of Phoric Posture to Reading Vocabulary (Girls)

Correlation of:	Phoric Posture (Minus 12 to Plus 12)					
					x' y'	
	Fy	Dy	FDy	FD^2y	Plus	Minus
Reading Vocabulary (2 to 10.9)						
Fx	48		13	197	66	51
Dx						(Plus 15)
FDx	-8					
FD^2x.	118					

cy $\frac{13}{48}$ eq .270 cx $\frac{-8}{48}$ eq -.17

C^2y .0729 C^2x -.03

Cy 2·70 Cx -.34

$y/\frac{197}{48} - .0729$ $x/\frac{118}{48} - -.03$

y eq. 2.06 x 10 eq 20.60 x eq 1.57 x 2 eq 3.04

Calculation of r: $r \frac{\frac{15}{48} - (.270 \times -.17)}{2.06 \times 1.57}$ eq. $\frac{.27}{3.23}$ r equals .08

Seventh, what is the correlation of Phoric Posture to Reading Comprehension in boys? in girls? The answer to this question is in Tables LXVI and LXVII.

TABLE LXVI

Correlation of Phoric Posture to Reading Comprehension
(Boys)

Correlation of:	Phoric Posture (Minus 12 to Plus 12)				x'	y'
	Fy	Dy	Fdy	Fd^2y	Plus	Minus
Reading Comp. (2 to 10.9)						
Fx	54		21	211	70	56
Dx					(Plus	14)
FDx	27					
FD^2x	131					

cy $\frac{21}{54}$ eq .39

C^2y .1521

Cy 3.00

$y/\frac{211}{54} - .1521$

y eq 1.94 x 10 eq 19.40

cx $\frac{27}{54}$ eq .5

C^2x .25

Cx .10

$x/\frac{131}{54} - .25$

x eq 1.47 x 2 eq 2.94

Calculation of r:

$$r \frac{\frac{14}{54} - (.39 \times .5)}{1.94 \times 1.47} \quad \text{eq. } \frac{.16}{2.85} \quad \text{r equals } .06$$

TABLE LXVII

Correlation of Phoric Posture to Reading Comprehension
(Girls)

Correlation of:	Phoric Posture (Minus 12 to Plus 12)				x'	y'
	Fy	Dy	FDy	FD^2y	Plus	Minus
Reading Comp. (2 to 10.9)						
Fx	48		17	171	49	49
					(00)	
Dx						
FDx	8					
FD^2x	118					

cy $\frac{17}{48}$ eq .35

C^2y .1225

Cy 3.50

$y/\frac{171}{48} - .1225$

y eq 1.85 x 10 eq 18.50

cx $\frac{8}{48}$ eq .17

C^2x .03

Cx .34

$x/\frac{118}{48} - .03$

x eq 1.56 x 2 eq 3.12

Calculation of r:

$$r \frac{\frac{00}{48} - (.35 \times .17)}{1.85 \times 1.56} \quad \text{eq. } \frac{-.05}{2.88} \quad \text{r equals } -.002$$

Eighth, what is the correlation of Phoric Posture to Grade Placement in boys? in girls? The answer to this question is in Tables LXVIII and LXIX.

TABLE LXVIII

Correlation of Phoric Posture to Grade Placement

(Boys)

Correlation of:

	Phoric Posture (Minus 12 to Plus 12)					
					x' y'	
	Fy	Dy	FDy	FD^2y	Plus	Minus
Grade Place. (2 to 10.9)						
Fx	54		-18	146	55	50
Dx					(Plus 5)	
FDx	27					
FD^2x	131					

cy $\frac{-18}{54}$ eq -.33

C^2y -.1089

Cy -3.30

$y/\frac{146}{54}$ - -.1089

y eq 1.60 x 10 eq 16.00

cx $\frac{27}{54}$ eq .5

C^2x .25

Cx .10

$x/\frac{131}{54}$ -.25

x eq 1.47 x 2 eq 2.94

Calculation of r:

$$r \frac{\frac{5}{54} - (-.33 \times .5)}{1.60 \times 1.47} \text{ eq } \frac{-.07}{2.35} \quad \text{r equals } -.003$$

TABLE LXIX

Correlation of Phoric Posture to Grade Placement

(Girls)

Correlation of:

	Phoric Posture (Minus 12 to Plus 12)					
					x'y'	
	Fy	Dy	FDy	FD^2y	Plus	Min.
Grade Place. (2 to 10.9)						
Fx	48		-11	129	50	46
Dx					(Plus 4)	
FDx	8					
FD^2x	118					

cy $\frac{-11}{48}$ eq -.229

C^2y -.0524

Cy -2.290

$y/\frac{129}{48}$ - -.0524

y eq 1.62 x 10 eq 16.20

cx $\frac{8}{48}$ eq .17

C^2x .03

Cx .34

$x/\frac{118}{48}$ - .03

x eq 1.55 x 2 eq 3.10

Calculation of r:

$$r \frac{\frac{4}{48} - (-.229 \times .17)}{1.62 \times 1.55} \text{ eq } \frac{-.04}{2.51} \quad \text{r equals } -.002$$

TABLE LXIX
(Cont.)

Correlation of Phoric Posture to Grade Placement

It will be noted that all calculation of a correlation coefficient produces a coefficient too small to be of any significance; therefore, a relationship between Stereopsis, Phoric Posture, and I.Q.,Phoric Posture and Reading Vocabulary, Phoric Posture and Reading Comprehension, Phoric Posture and Grade Placement does not exist as far as the findings of this battery of tests is concerned.

SUMMARY AND CONCLUSION

Introduction

Before we present a summary of our findings based upon the data obtained from and limited to the Telebinocular procedure, and the subjective response elicited, we wish to describe the subjects of our investigation so that the reader may be able to make his own evaluation of the findings.

In making the findings applicable to other groups, the reader is not likely to be in error if he interprets the findings as being generally applicable to school districts slightly above the average.

Sources of Data

Our subjects are all members of the Alhambra School District including from the 3A grade up, and we believe an excellent cross section of a typical American school population slightly above the average.

The average I.Q. of the district is 107. The average yearly turnover is 15% for both the Elementary and High Schools. About 40% of each year's Freshman class is graduated.

As to transients, the great majority come from the North Central area; less than 1% are directly from the Dust Bowl, and none from the deep South, that is, south of the Ohio River and east of the Mississippi River.

About 1% is negro and oriental.

Alhambra for the past several years has been awarded the National Health Prize for the healthiest city in its class (25,000 to 50,000 population).

The personnel, while not trained clinicians, were very efficient for the purpose of the survey which was to detect only departures from normal, not to diagnose.

It should be borne in mind that all the tests were subjective, that is, the examiner had to rely entirely upon the answer of the pupil as to what he (the pupil) observed.

Where comparisons are made with normals, the normals are selected from the same age-grade groups as the defectives.

Tables I and II

Indicate that only a small proportion of the entire number examined, 17.6% for the elementary, and 12% for the high school students to be exact, show no departure from normal. To state it in another way, 83% to 88% of all tested show some type of visual deficiency.

One interesting fact will be noted in the above; there is a 5% difference in favor of the elementary group when we should naturally expect exactly the opposite. (Neverthless, we think this item of 5% is going to recur so often and in so many places that it almost becomes a constant).

Tables III and IV

Here we have division of the high school students according to sex, and it is immediately apparent that 5% is in favor of the girls. That is, the boys show 5% more defectives than the girls.

Tables V-VI-VII

Show results of test # 1 which was an introductory test to acquaint the pupil with the general type of test to follow. No comment will be made.

Tables VIII-IX-X

Test # 2 (Fusion at Far Point). Here again we have 5% difference in favor of the elementary pupils, and upon further comparison we find the high school girls show an increase of 5% over the boys in defectives, as in Tables III and IV.

Tables XI-XII-XIII

Test # 7 (Fusion at Near Point) is considered at this time on account of its similarity to test # 2, with the exception that it is made at the near point. The results here show exactly the same trend as # 2 test, approximately 5% increase in defectives among the high school girls.

Taken grossly, the findings of tests # 2 and # 7 would seem to indicate that approximately 40% of all pupils (including the doubtful) have some type of incoordination causing poor vision.

In the opinion of the writer the above is not necessarily a true picture because:

It should be borne in mind that all the tests were subjective, that is, the examiner had to rely entirely upon the answer of the pupil as to what he (the pupil) observed.

Where comparisons are made with normals, the normals are selected from the same age-grade groups as the defectives.

Tables I and II

Indicate that only a small proportion of the entire number examined, 17.6% for the elementary, and 12% for the high school students to be exact, show no departure from normal. To state it in another way, 83% to 88% of all tested show some type of visual deficiency.

One interesting fact will be noted in the above; there is a 5% difference in favor of the elementary group when we should naturally expect exactly the opposite. (Neverthless, we think this item of 5% is going to recur so often and in so many places that it almost becomes a constant).

Tables III and IV

Here we have division of the high school students according to sex, and it is immediately apparent that 5% is in favor of the girls. That is, the boys show 5% more defectives than the girls.

Tables V-VI-VII

Show results of test # 1 which was an introductory test to acquaint the pupil with the general type of test to follow. No comment will be made.

Tables VIII-IX-X

Test # 2 (Fusion at Far Point). Here again we have 5% difference in favor of the elementary pupils, and upon further comparison we find the high school girls show an increase of 5% over the boys in defectives, as in Tables III and IV.

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Taken grossly, the findings of tests # 2 and # 7 would seem to indicate that approximately 40% of all pupils (including the doubtful) have some type of incoordination causing poor vision.

In the opinion of the writer the above is not necessarily a true picture because:

The target in the test in question consists of four dots of various colors arranged in two vertical rows so that when fused there will appear to be three. These two center dots that are to be fused are the complementary colors, yellow and blue, and if , of perfect saturation when fused, produce a third color or white. The fact that we do not ordinarily have to fuse complementary colors and further that it is impossible to obtain perfect saturation, the result of the fusion would not be white under any condition, and it would tend to cause some confusion in the mind of the pupil itself; the creation of a dilemma will of necessity cause an exaggerated reflex. Further, anyone who is familiar with stereoscopic tests should know there is a wide variance in the stimulus quality of different targets, and the dot must be set very low down in the scale.

The above should explain in part the large percentage of doubtful cases in both elementary and high school pupils.

To satisfy his curiosity, the writer ran a test on 318 elementary school pupils, grades 3 to 8 using the "Wells"[1] target ON NE, the letters being placed in a horizontal row and well within the area of binocular fusion.[2] In this test approximately 11 % failed. There were no doubtful cases; the pupil either saw the word <u>one</u> by fusing the two Ns, or a failure was recorded.

<u>Tables XIV to XXII</u>
Test # 3 A-B-C

Visual acuity is one subject that has been covered in visual surveys to the exclusion of practically all else, so that what we find here will be of necessity repetition. Our findings indicate that the higher acuity is carried in the right eye; only one (1) case in 5821 shows acuity of 110% in the left eye. Our findings also show that the research of Bordier[3] and his conclusions that the male reaches a higher visual acuity than the female, but the female matures earlier, is correct.

That 20% of the elementary school pupils and 33% of the high school pupils have visual acuity in excess of 100%.

That the ratio of zero acuity (amblyopia or amaurosis) of the left eye to the right eye is two to one.

<u>Tables XXIII-XXIV and XXV</u>

Test # 4 (Vertical Imbalance) results confirm what has generally been known, that vertical imbalances occur infrequently. This test indicates that they occur 21 per thousand cases.

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1 See page 73
2 See page 73
3 Sheard, <u>Physiological Optics</u>

Tables XXVI-XXVII and XXVIII

Test # 5 (Stereopsis) The writer believes this is the first time complete data has been published on stereopsis or depth vision, and the figures indicate that a larger percentage of elementary pupils have a higher percentage of depth vision than is shown by the high school pupils.

Here also we note that the number of high school girls showing zero stereopsis is twice as great as that of high school boys.

That only 66% of the girls show 100% stereopsis.

That only 73% of the boys show 100% stereopsis.

A plausible explanation of the above could be that the advance of the pupil through the grades imposes an increasing visual load. If there is an imbalance in the ocular musculature the zone of comfort may soon be exceeded and suppression of one eye with loss of stereopsis results.

Again an increased amount of reading with its attendant increased concentration tends to bring errors of motility to the level of consciousness to be eliminated by mental suppression.

We speak of the increasing visual load but perhaps we should use this term with more discretion, since it is actually an increasing mental load. As far as the actual visual load is concerned, school authorities require from the printers of text books a first grade text of 20/150 (Snellen Standard), for second and third grade texts 20/100 is required, and for grades succeeding this, the size of the type must be kept well above the minimal size for adults.

So we see that the factor of safety as far as eyestrain is concerned in relation to type size for reading is ample. The developing mind trying to grasp the meaning of the printed page, using the sense of sight as the contacting medium, sweeps the eyes forward and back, and the number of fixations and regressions is directly proportionate to the difficulties presented by the text. If we could remove the mental factor there would be no relation between fixations or regressions and the speed of reading.

In striving to better understand just what takes place in the act of reading, the writer has, by experiment succeeded in the separating of visual acuity from mental acuity, and was astonished to find how enormous the factor of perceptual fill in is as compared to what is actually seen by the eye.

Recent investigation would indicate that it is the moderate reader who makes the best grades, not the heavy reader or the light reader.

In reference to stereopsis or the visual factor of depth vision, a sidelight might prove of interest. While our report includes the 3rd to 12th grades only, the survey indicates that 85 to 90% of the kindergarten

and first grade pupils have zero stereopsis but that this faculty develops very rapidly after that age period.

Tables XXIX to XXXIV

Test # 6 A and B (Lateral Imbalance). Here we again find the elementary pupils showing fewer failures than the high school pupils.

Comparing high school girls and boys, we find that in this test both at near and far point there is a slight edge, less than 1%, in favor of the girls.

Tables XXXV to XLVI

Test #8 A and B. Just what this test is assumed to show above Test #3 A-B-C is problematical. It is made at both the far and near points and the marked discrepency between the near point and far point findings should be noted. Findings which vary from 14% to 29% at the far point vary only 2% to 4% at the near point.

If the test really shows the existence of ametropia at the far point what has become of it at the near point? Has the accommodation compensated for it?

Comparing the far point findings with Test #3 A-B-C (also taken at the far point) this test (#8-B) shows the same general outline as #3 A-B-C in that the number of defectives is greater among the high school girls than boys, but the number of defectives is not as great as disclosed by the test #3 A-B-C. The variation being approximately 5% in favor of #3 A-B-C test.

It would seem that this test (#8A and B) is not as efficient as Test #3 A-B-C.

Our generalization from the data presented in the survey is that there is no connection between ocular defects as measured by the Betts Telebinocular tests and scholastic achievement. However, we readily admit that such generalization is inadequate for particular cases of ocular defects; but for the mass of pupils the survey will stand on its merits in selection of cases which need ocular attention.

CONCLUSION

The general conclusions from the findings may be reported as follows:

A relatively large proportion of both elementary and high school students have ocular deficiencies of some nature.

The usual medical health service of the district does not reveal the

lack of adequate ocular care.

Ocular defects are found more frequently among high school students than elementary.

Ocular defects are found more frequently among high school girls than high school boys.

Ocular defects are not found more frequently among students making poor grades.

When our subjects are grouped according to age-grade, we find no significant difference between the normals and the defectives in their Grade Placement, Reading Vocabulary, Reading Comprehension, or Passing or Failing, whether taken by averages or percentage.

Study of the relationship between Stereopsis and I. Q. reveals too small an r to be of any significance.

Study of the relationship between Phoric Posture and I. Q.,Phoric Posture and Reading Vocabulary, Phoric Posture and Reading Comprehension, Phoric Posture and Grade Placement reveals too small an r to be of any significance.

Defectives as defined by this battery of tests make equal or better grades than the normals.

The prediction that the mere correction of ocular defects will guarantee immediate improvement in scholastic achievement is not proven by the facts.

Finally, there is very little, if any, general relationship between Normal or Defective Vision and Scholastic Achievement.

The application of the above conclusions are to be made to similar groups (not individuals) who have been given similar tests.

AUXILIARY DATA

TABLE LXIX
Letters to Parents
ELEMENTARY

Number Mailed	No Reply	Finan. Unable	Number Rec. Att.	Total Acc. for
577	370	6	201	577
%	64.	1.	34.9	

Of the 2729 elementary pupils 577 or 20.8% were considered sufficiently handicapped to require immediate attention.

TABLE LXX
Letters to Parents
HIGH SCHOOL

Number Mailed	No Reply	Finan. Unable	Number Rec. Att.	Total Acc. for
856	496	13	347	856
%	58.	.14	40.	

Of the 3092 High School pupils 856 or 27.8% were considered sufficiently handicapped to require immediate attention. Of these, 377 or 44% were boys and 479 or 56% were girls. (Note: It is quite possible that other replies have been received since inception of this report)

* * *

C O P Y

(Letterhead)
Alhambra City Schools
601 N. Garfield Avenue
Alhambra, California

Dear Parent:

A preliminary check of _____ vision indicates there may be some difficulty present which may interfere with school success.

Common findings in pupils with defective vision include: squinting while reading, rubbing of eyelids, watering, burning, smarting, or inflammation of eyes, headaches, failing to hold attention to close work, and dislike for reading. If you notice any of these symptoms, it would seem advisable to have the child's eyes examined by an examiner of your own choice if you have not done this recently.

This report is the result of a careful survey of the entire school district and has taken two years to complete.

We will appreciate a reply as soon as possible, and for your convenience the following form is attached.

(Ralph L. Schroeder, M. D.)
School Physician

.....

Dr. Ralph L. Schroeder, School Physician
Alhambra City Schools
Alhambra, California

Dear Dr. Schroeder:

1._____ My child does wear glasses for corrective vision now.
2._____ My child does not wear glasses for corrective vision now.
3._____ Examination of my child's vision was made last on _____19 __.
4._____ An examination has not been made.
5._____ I will have an examination made soon. 6.Remarks:

(Signed)_____
Parent's Signature

Stokesbary and Delton 34

BULLETIN

C O P Y

_____ School

Teacher_____

Please indicate which of the following pupils, in your opinion, are of the Mental type and which are of the Manual type. Indicate your opinion by placing check in proper column. Rate only those pupils with whom you are sufficiently familiar to give a fair rating.

The Manual type refers to the type of pupil who likes to do things with his hands, and seems to be adept at this, but who does not enjoy extensive reading or other mental activities. The Mental type refers to the youngster who seems to lean toward the academic type, and who does not seem to show as much mechanical ability and manual dexterity as the Manual type of student.

In order to be of service to us this report should be returned to the Research Office as soon as possible.

(M. R. Stokesbary)

C O P Y

November 14, 1939

C. R. Teacher:

You will find attached a number of notices to parents regarding defective vision of students in your C.R. You will also find attached a list of the students for whom blanks have been prepared. Please see that the students take these notices to their parents and return the reply slips to you as soon as possible. When you have received a reply from each notice sent, please send these to the Health Department. You will find it necessary in some cases to check on your students to be sure they take the notices home and return the replies. If for any reason one of the blanks is lost, please make a note to that effect and attach to the package of slips sent to the Health Department so that another notification may be sent.

If you receive a notification for a student not in your C.R., please make a note to this effect on the corner of the slip and send it to the Health Department so that it may be sent to the proper C.R. if the student is still in school.

(Ralph L. Schroeder, M. D.)
School Physician

LETTERS SENT TO PARENTS

C O P Y

ALHAMBRA CITY SCHOOLS
ALHAMBRA CALIFORNIA

Additional equipment has been received for the examination of the eyes (vision) of pupils in the Alhambra Schools.

It is not a policy of the Schools' Health Department to routinely examine the eyes of pupils who habitually wear glasses. However, if you wish your child to have this service, kindly return the enclosed card.

(School Physician)

Date_____

C O P Y

Health Department
Alhambra City Schools
Alhambra, California

I would like to have _____ receive the routine eye examination as now provided by the City Schools.

I understand that this examination is not intended to conflict in any way with any previous eye examination.

_____
Parent or Guardian

BIBLIOGRAPHY

Sheard, Chas. (3) Physiological Optics, Age and Sex Factors Influencing Visual Acuity
Savage, C. C. (2) Ophthalmic Myology p. 175
Wells Charts (1) American Optical Company, Southbridge, Mass.

COST OF SURVEY

Approximate Pupils in District	6,000
Estimate Total Cost Per Pupil	$ .43
Estimate Cost Per Pupil To District (Balance absorbed by W.P.A.)	$ .35

READING TO CHILDREN

Louise C. Harris, Chino Schools

"Please read this book, Please read this book, Please read this book! "

The book is pounding my knee and my nephew will keep pounding until I take my knee away or read the book. This time it is the "Dairymaid One" out of Milne's "When We Were Very Young." Next time it may be Maud and Miska Petersham's "The Christ Child." What ever it is, with a leap, Jack is up on my lap and we have begun, he at the pictures, and I, the words.

If you find words lovely, savour them with a three-and-a-half-year old, and they will take on a whole new world of charm. I say, "And the Angel said unto them," and a young, grave, delighted voice prompts me, "Fear not!" Nothing can stop us now except bath or food or bed, and they have no power until we have "read it all one time."

Young children are enchanted by agreeable sounds in rhythmic movement such as Mr. Milne's "Shoes and Stockings"[1] or Vachel Lindsay's "Potato Dance".[2]

Long years ago a four-year-old was taking his afternoon nap on two of us in the back seat of a car, touring the north shore of Lake Superior. Softly, I told him the lullaby [3] Kipling's Mother-Seal told her baby. "Sing me that story again," said he, and the swing of it was a song to him.

One night last summer an early moon surprised my nephew and me and I was reminded to "Sing that story again", this time to one just turned three.

The next night came a request,

"Sing me the Sharkle Shory."

"What do you want?"

"Sing me the Sharkle Shory."

"I don't know the Sharkle Story"

"Yes you do, I want ---the sharkle---shory."

"(Sharkle -----sharkle-----what could he mean?) "Sparkle?"

---

1. A. A. Milne, When We Were Very Young, page 71.
2. Silver Pennies, ed. by B. J. Thompson, page 56
3. R. Kipling, Jungle Books, "Seal Lullaby", page 2

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"(Sharkle -----sharkle-----what could he mean?) "Sparkle?"

1.A. A. Milne, When We Were Very Young, page 71.
2.Silver Pennies, ed. by B. J. Thompson, page 56
3.R.Kipling, Jungle Books,"Seal Lullaby", page 2

"You mean the waters that sparkled?"

"A contented rustle in the dark, "Gin at a ginning."

After that night the Sparkle Story was a regular ceremony. One night Aunty missed. Early next morning a voice beside her ear said, "You didn't ought to not tell me the Sharkle Shory, but (with a large smile) I'll tell you the Sharkle Shory NOW ! " So he folded himself up on my bed and said:

"Ohushee my baby -- nightees behine dlee
And dark are a warters -- a sharkle so green...
Moon do comber .. Look downward find lee
Rest en a hollow .. rustle be-tween."

After which he melted in joyous laughter ... and was "stuck" and couldn't go on... but later when he was playing with his blocks he told them the whole story..unintelligible to the lay-man perhaps, but he had every foot of the metre. He didn't ask any thing about the words he didn't know... He liked the music of the sound, and he took all the sounds on trust.

Two months later: "What is slow swinging seas?" (Now what shall I say?... I've brought this on myself...)

"Water, swinging..."

"How swinging?"

"I'll show you in the bath tomorrow" (largest body of water near enough). So the next day he swung the water, and not so long after, we were at the sea. On a tiny ferry boat, we watched the water "swing" by, and later walking out on the pier found "Billows" with "Hollows" between, and we looked at each other and laughed, because there they were, and WE had discovered them.

Children for generations have had their "first experiences in literature" from a friend or relation through the pages of Mother Goose [1]. One person [2] who has read with children more than most says, "The sense of wonder combined with every-day common sense are all there, and the music of the jingles, their fine rhythm and varied rhyme schemes train the ear at the same time that they satisfy it."

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1. See Mahony and Whitney, Realms of Gold, page 16
2. Anne Thaxter Eaton, Reading with Children, page 42. Copyright 1940 by Anne Thaxter Eaton. By permission of the Viking Press, Inc.,N.Y.

Not only do two and three-year olds enjoy the repetition within the rhyme, but it must be repeated over and over, "Read it again.. two times more..one more time."

After a few readings they know the story as well as you --try to change one word and find out -- but still the delicious flow of words trickling over them is delightful.

Here is a child's first step into the great world of fiction, for what else but very simple stories are the adventures of Little Boy Blue, Jack and Jill, and Little Jack Horner?

A certain sense of humor--not adult--grows with a growth of vocabulary. Nonsense syllables are fun when you really know they are not the right words. A boy of two-and-one-half had heard "Three Blind Mice" sung by his mother. One day his father was asked for the song. Not knowing the words he sang with abandon, "Dee di de do-- Dee di de do" -- to bursts of laughter from his son.

Other poems and stories should be read to the small child. Here we find a difference of opinion as to content. Some say the poem or story must be within the child's experiences. Some go so far as to limit tales to the very simplest words, while others say "poems may be read of which he can not possibly understand the meaning"[1] To learn to listen to great verse is the beginning of a love of poetry. Can we not choose as some one has said, a middle way? Choose the poem which has an experience the child may understand, with a bit to stretch his imagination.

Choose not the poem written down to children. Spritely sentimental-- a poem may be simple-- and beautiful. Alice Dalgliesh[2] gives two examples:

Eleanor Farjeon's

"Down, down!
Yellow and Brown
The leaves are falling
Over the town."[3]

Christina Rossetti's

"On the grassy banks
Lamkins at their pranks,
Woolly sisters, woolly brothers
Jumping off their feet,

---

1. Ibid, page 43
2. Alice Dalgliesh, First Experiences with Literature page 69
3. Eleanor Farjeon, Joan's Door. Copyright by Frederick A. Stokes Co.,N.Y. Permission granted to quote.

While their woolly mothers
Watch by them and bleat." [1]

Most of the best literature for children has been told or written, first directly to certain children; or by those whose understanding is deep and delightful, and they have the story in them that they must "get out".

Kenneth Grahame, Leslie Brooke, Hugh Lofting, A. A. Milne, -- all wrote first for sons.

Mr. Milne is a good craftsman. His verse is "well made", but whatever his reasons for writing, there is that in him which makes one feel he is "inside" in understanding children.

Children like to put themselves in "loco parentis": Read Mr. Milne's "Disobedience" and your children will find great satisfaction in the swinging rhythm and the understandable "I'll take care of you" feeling.

A small boy calling his Aunty on a toy phone said, "Do you know about rivers? How deep they are in the Minnel? They're just a little deep on the sides, and don't ever let me catch you out in the minnel ! "

Telling stories, or reading to a group of four-year-olds is more difficult of course than to one child. Here are individual differences--children who have been read to at home and children who have not. "Jimmy doesn't seem to care for books", said a mother visiting us one Sunday afternoon, when Jack came in with his "Please read this book." But when we really got into the pages of "Beach Comber Bobby", Jimmy (six) was leaning over one knee while Jack pushed the other one. "I guess we didn't bother to read to him," she said wistfully.

Pictures help; simple colored pictures, a small group of four-year olds really got together first over Leslie Brooke's "Johnny Crow's Garden", Even if you don't know the words, they are so few a glance will give them to you, and you can give the most important part, the picture, to the children. There is a gracious quality to "Johnny Crow" which is very good for the young, and those not so young.

It would be well for mothers and teachers to have the same basic understanding of what is being read to the individual child. Here is an example from that first day in school. Carl came to school beaming.Everything was wonderful: he painted, he piled blocks, he hammered, he slid down the outdoor slide, and sometime during the morning he looked with the others at a magnificent picture of a Pelican in Johnny Crow's Garden. The Pelican can stand on one leg, said the teacher. The children had a chance to stand on one leg too, and when Carl's mother came for him he met her at the door beaming; he stood on one leg. "What's the matter with your leg, Carl?" Carl said nothing; just stood on one leg waiting appreciation. The mother's face was a question mark until the teacher showed the picture of the Pelican, and the two went home happily.

---

1. Christina Rosetti, Sing Song. Copyright by the Macmillan Co.,N.Y. Permission granted to quote.

Another group of four-year olds listened to a poem or two nearly every day just before their morning rest time. Some favorites were: Walter de la Mare, "Some One"[1]; John Kendrick Bangs, "The Little Elf"[1]; Oliver Herford, "The Elf and the Dormouse"[1]; Josephine Taskam Bacon, "The Sleepy Song"[1]; "The King's Breakfast"[2];"The Brownie"[2]; "Halfway"[2]. The poems were read without comment.

Some weeks later a mother asked, "When did you teach Dorthea all that poetry? She has been telling us poems at lunch time this week. Betty, (a sister), aged seven, has decided no four-year-old is going to get ahead of her and is deep in poetry too." This was as much a surprise to the teacher as to the family at home. After that they had fun all year saying favorite rhymes together.

The children are now becoming interested in content -- stories about animals, and children, and things they know, and nonsense which they understand,as nonsense, about things new to them.

Perhaps Peter Rabbit[3] is every child's first rabbit. I have lived through fourteen years of Peter Rabbit with children in kindergarten, and have yet to know the child who disapproves of Peter.

One finds quite a difference of opinion concerning fables. Alice Dalgliesh says, "One type of story to be avoided for use with young children is the fable. Because adults know the children like animal stories we find Aesop's Fables on many story-lists. These fables are beyond the comprehension of children who as yet have had little or no experience with the virtues and vices portrayed in them. Fables are distinctly negative in tone, for they emphasize undesirable traits in order to point a moral."[4]

Ann Eaton says fables satisfy little children because of their directness and brevity and because of their talking animals, always dear to the young child.

I have no personal experience in reading fables to children. Perhaps I was caught too late: the first fables I remember were the ones I skipped on the way to "Beauty and the Beast", "Cinderella", and the "White Cat". They were all in the same book, to me a waste of good pages.

There are, however, many interesting and delightful animal stories for the four and five-year old. Marjorie Flack's "The Story about Ping", a little duck, "Tim Tadpole and the Great Bullfrog", "Angus and the Ducks",

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1. Silver Pennies, ed. by B. Q. Thompson.
2. A. A. Milne, When We Were Very Young, Macmillan Co.
3. Beatrix Potter, Peter Rabbit. Warne.
4. Alice Dalgliesh . First Experiences with Literature . page 71. Copyright by Charles Scribner's Sons, N.Y. Permission granted to quote.

"Angus and the Cats", Wanda Gag's "Millions of Cats", Lena Towsley's "Five Little Kittens", are some examples of imaginative and real stories to be read while the children read the pictures.

Lucy Sprague Mitchell has found adventure in every-day life for the child of nursery and kindergarten age. Her first "Here and Now" story book was published in 1921. Admittedly an experiment, written "because of deep dissatisfaction felt by a group of people working experimentally in a laboratory school (the Harriet Johnson Nursery School),with the available literature for children. Both the stuff of the stories and the mould into which they are cast, are based on suggestions gained directly from children."

Now, she and others working with her have published another volume. They are stories about things children see and feel and hear:"Blocks in a cart", "Billy's Bath," "Ferry Boats" And as the children grow up into "six and seven year oldness": "The Workmen Build the House," stories and poems about the wind, water, snow, sheep, whatever interesting thing has come into the child's experience. Some of the stories have universal appeal, some are perhaps more interesting to the children who inspired them. Some of the stories are admittedly type stories not to be told as they stand, but are given as an experience which has interested children. The nonsensical ones are, I believe, general favorites. There are stories for each separate age beginning with two-year-oldness and in the newer book they are supplemented by personality sketches of children, "for the grown-up who reads or tells the stories." They are the outcome of years of study of maturation levels of children in the Harriet Johnson Nursery School and the Little Red School House in New York and Rosemary Junior School in Connecticut.. These sketches together with some comments about individual stories in the book are, as Mrs. Mitchell says, "to help the adult reader over his greatest handicap --- his adultness! "[1]

The manner of presentation of any story or poem to children is of utmost importance, but if one puts on a "manner" in the telling or reading, then the spirit of the story is gone. "Enthusiasm for good books, shared with children communicates itself to them." Miss Huber in her book of "Story and Verse for Children," says the "two things needed are an understanding of children and a genuine appreciation of literature." A deep delight in the words changes them from dull gray to rainbow hue. Words can be as dull as the foods in Eleanor Farjeon's poem:

"Can't mutton be dull
And potatoes be dull
And pudding be dull
And slices of bread

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1. Lucy S. Mitchell, Here and Now Story Books page 1. Copyright by E. P. Dutton and Co.,N.Y. Permission granted to quote.

With four walls all 'round
And the floor for the ground
And a ceiling all sound
And safe overhead?"[1]

Or as full of adventure as food out of doors:

"And can't bread be sweet
And slices of meat
And pudding to eat,
What beautiful fare,
With trees all around
And grass on the ground
And the sky full of sound
Of the birds in the air!"[2]

Whether the story be told or read, depends partly upon the story, and partly upon the teller or reader. Those who don't memorize easily and must stick to the words...had better read. Some stories need the accompaning pictures, which are a real part of the story. I like to have the book in my lap even if there are no pictures and I never open it once: here is my source, a point of reassurance to me and a point of interest in books to the children. It has been said, "Love of literature cannot be taught but it may be caught." It seems to me rather that it should be of gradual growth built on the earliest recollections of reading with a grown-up: finding adventure in stories told to a group, and when the power comes the joy of selecting and digging in to one's choice of reading.

When children begin to read for themselves..too often adults draw a long breath and leave them to it. With some children this is the thing to do. Left to themselves they will make good choices. Others need a little push, and help in finding something to read. Parents say "the children have been read to so much they are lazy, they won't read themselves." This may be because the story is technically too difficult. It will be long before the tantalizing inspired literature for children will be restricted to an easy word list. Children who have no difficulty in reading will push ahead, ask for the words they do not know, while those who have trouble may miss the priceless gift of pictures other folk have seen or imagined and put into words on paper.

Even the readers may miss stories they would have loved, if some one hadn't read them a bit first. I remember an eleven-year-old who looked around the Pasadena Library with an overwhelming feeling of sadness. There was just one good book left to read, and she had it in her hand. In that moment she looked down the years of no more books, at least

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1. Eleanor Farjeon, Food out of Doors in her Over the Garden Wall, Stokes. Copyright by Frederick A. Stokes Co.,N.Y. Permission granted to quote.
2. Ibid.

no more new books. Things looked better, though, when a reading-aloud-family introduced her to as yet unexplored towns and times and people in books.

Some of the best stories might seldom come down off the library shelves if the child, the middle sized child, this time, had not heard a bit of them aloud. One afternoon I listened to Mrs. Gudrun Thorne-Thomsen tell something of animal stories children should know. Amongst other things she read, or told, I can't remember which, a part of Kenneth Grahame's"Wind in the Willows." I'd never heard of it. I went out and bought the book. I read it to all the grown ups who would listen. "This", said I, "is a grown-up book. Too big, too many hard words, too much talk about Spring". But one summer day I was visiting a girls' camp: a group of ten-year olds were walking beside a stream. At the end of the trail we sat a moment listening to wood sounds. "Won't you tell us a story?" asked the leader. All kindergarten teachers are supposed to have a fund of stories for all ages. What should I tell them? The stream chuckled at my dilemma. Suddenly Mrs. Gudrun Thorne-Thomsen's quiet voice came through the chuckle of the stream. "By the side of the river he trotted as one trots, when very small, by the side of a man who holds one spellbound by exciting stories:" and I told them of the Mole[1] who left his Spring cleaning because Spring was moving about in the air above him and he had to go and find out about it. When I told how he found the Water Rat who invited him to ride in a little boat "painted blue outside and white within, and just the size for two animals." "Do you know", said the Mole, "I've never been in a boat before in my life."

"What?", cried the Rat, open-mouthed: "Never been in a --well I -- what have you been doing, then?"

"Is it so nice as all that?" asked the Mole shyly .....

"Nice? It's the Only thing," said the Water Rat solemnly as he leaned forward for his stroke. "Believe me, my young friend, there is nothing -- absolutely nothing -- half so much worth doing as simply messing about in boats. Simply messing," he went on dreamily: "messing -- about --in -- boats--; messing..."

"Look ahead, Rat!" cried the Mole suddenly.

"It was too late. The boat struck the bank full tilt. The dreamer, the joyous oarsman lay on his back at the bottom of the boat, his heels in the air.

"-----about in boats -- or with boats," the Rat went on composedly, picking himself up with a pleasant laugh."

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1. Kenneth Grahame, Wind in the Willows, Scribner's. Copyright by Charles Scribner's Sons, N.Y. Permission granted to quote.

I had told as much as I could remember of the delights of the picnic on the little island in the river; and when we had to go back to camp, the children with purpose in voice and eye, said, "Is there more of that, really in a book? What book, where can we get it?"

How many children take home a book of poetry to read to themselves? Not very many. Is that any reason for missing good poetry? Miss Huber[1] says provision for well-rounded experience in literature will give an important place to poetry. In it mankind has given expression to something more than ideas, its rhythms and cadences are universal in their emotional appeal. Children find pleasure in hearing poetry. A suitable poem read casually but well, often with out comment, will find an audience. The teacher who continues to read, will soon have eager listeners. It is a natural step for children to attempt to write verses of their own and even to put them to music.

Wise selection of good literature well read, can be important through all the grades. I asked a supervisor of elementary schools in a city system, what she thought of reading aloud. "Perhaps we have not stressed reading aloud, because so often the selection is made with little judgement, and teacher and pupils sit back and waste time over poor material. If the subject is worthy and the reader sincerely interested, value is there."

So often literature has been spoiled for children by poor handling. Our English teacher was absent for a month and the principal took our class. Instead of picking Shakespeare to pieces, he read with great enjoyment Julius Caesar, the only play I can remember in class though I know we struggled with several.

Whether it is the child who grows up in a reading-aloud-family who will be the one to find value in the wonder and truth and humor of good books, or not: reading aloud makes for a good company feeling, of charming ceremonies shared. My brother and I used to follow each other about sharing adventure with those people we had come to know in books. That is, we read aloud until we couldn't read fast enough to find what they did next.

The ceremony which has colored my thinking about reading aloud to children was an afterdinner one, under a tall lamp with a curled iron base. My uncle in his big chair, the light all soft yellow on his ruffled brown hair as he rolled out delightful sounds from Hiawatha, or boomed, "Look W-e-l-l-, Oh Wolves," from the Jungle books. He was the old wise leader, and we were Mowglies, safe in the lamp light. There must have been much we could not have explained, but Uncle did not stoop to spoil things by explaining, and the words made lovely sounds in our ears so that later when we read them ourselves, we could still hear Uncle's voice in them and feel the warmth of the yellow light.

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1. Miriam Huber, Story and Verse for Children, page 4. Copyright by The Macmillan Co., N.Y. Quoted by permission of the publisher.

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REMEDIAL READING PROGRAM EMPHASIZING PREVENTION

Huberteen Kueneman, Director of Elementary Education, Santa Ana City Schools

Introduction

The public schools should be doing more than they are doing for older children who do not read efficiently. There should be some office, some service in the local public school available to parents the year around.

The special services required to carry on such a program, and the technical skills which the classroom teacher might master, all are of such nature that they can both be afforded and enjoyed by the ordinary public school system.

Part I.

To support this thesis I purpose to describe the reading program of one school system that has attempted to meet these problems. The program at least attempts a scientific approach to the problems. No final answers are intended.

Every school system is committed to one of two policies, whether or not the policy is determined through a consciously exercised choice. The child in need of special reading instruction is either given that help or he is allowed to go on in his various activities and move from grade to grade without the help of special training.

The plan to be described is not the only way which might be attempted. But it is one plan that has worked quite successfully, system-wide, in the elementary grades. The school operates on a limited budget and accepts teachers without experience.

A Brief Overview of the Continuity of the Program from Grade to Grade

Preventing reading disabilities among children is the emphasis of the primary reading program.

In first grade there is a functional approach to reading through many non-book reading activities.

The emphasis upon the more formalized teaching of beginning reading has been shifted from the first to the second grade.

Learning to read is not an incidental outcome of the primary grades. We have daily periods devoted to reading teaching. But, we expect that beginning reading instruction will occur in the second and the third grade just as readily and as effectively, as it once did in first grade.

The third grade we call our "screening" grade for remedial cases. Here,

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The third grade we call our "screening" grade for remedial cases. Here,

with the help of our school psychologist, teachers and principals attempt to locate all remedial cases. We consider as remedial cases those children who do not read up to the expectancy level set by their chronological and mental ages and by their performance in non-reading activities.

In whatever grade remedial instruction is given, it is done by the regular classroom teacher. The regular teacher is given relief assistance one hour a day for a stated number of weeks in order to give this remedial instruction. Having the regular teacher do his or her own - it is usually her - we believe is a strong factor in our program of prevention of reading disabilities.

The majority of our present staff in elementary schools has now had special training in making a diagnosis of reading difficulties and in applying corrective measures. With this training teachers are able to administer and interpret the diagnostic reading examinations, which are still all too largely tools of diagnosis reserved for use by the clinical psychologist. The training is made available each year to the teachers coming new to our system.

A six-year phonics' program. In grades 4,5,6, the phonics teaching is closely tied up with the teaching of the dictionary skills. For this part of the program, classes are provided with a set of one of the newer teaching dictionaries for children.

Part II

Some Remedial Techniques

Let me round off this presentation by mentioning briefly some remedial or corrective methods and devices which, in our situation, have helped particular types of difficulties.

When you deal with a retarded reader and before you conclude that he has not enough phonics instruction, or that "he doesn't know his sounds", go a bit further to see if his difficulty may not be due to the fact that he is unable to blend the string of sounds into a word. Or, the difficulty behind this same manifestation may be that the pupil has never been encouraged to use the sense of the story and his knowledge of what the first two or three letters "say" to guide him toward a sensible guess as to what the word may be. Suppose the child comes to the sentence, The dog wagged his tail. He is blocked by wagged, but knows dog and tail and that the unknown word begins with "wuh". We may say to the child, "You know the sentence says something about a dog and his tail. What could a dog do with his tail that starts as that word does?" To be completely successful this pupil must be aware of what he is doing, that is, he must learn that a majority of good readers utilize this device when they come to an unfamiliar word.He also needs to utilize this technique frequently and always with success. If you introduce this technique to a child to whom it is new, you will know soon whether he has caught on, for he will be bragging about his accomplishments. He will volunteer, "Do you know how I knew the word was pricked? It is pricked, isn't it? Well, it's about the dog's ears. I thought at first

it was picked, but I saw that word up and I knew a dog couldn't "pick up his ears", so I looked again and it begins with pr."

I mentioned that the difficulty could be due to the lack of ability to blend sounds into words. Pupils with such difficulties may come across a-r-m and are unable to get a word from it. They give the isolated sound valued, but are unable to blend them into a word. "aa-er-mm". Again it shows up with a blend like st. The child mouths something like "suh-tuh". We have helped several pupils develop the ability to blend, and from this start go on successfully and enjoyably to reading. It was done largely by a method which employs the auditory, the motor, and the visual clues almost simultaneously.

To illustrate the method briefly. Write ar on the blackboard. Child repeats after teacher. Child writes the two letters and as he writes says "ar says r." Then present the sound in several words by repeating the words orally. Ask the child to listen for the "R" sound. (arm, art, far, farm, car, card, cart). After the auditory step, the child learns to write the word. He articulates the sounds as he writes the word. At this point, he is combining motor, visual and auditory aids to fix the word. Or, st says "st" as in stop, etc. The same build-up can be used to fix single vowel and single consonant sounds. The method is fully described in Stanger and Donohue, Prediction and Prevention of Reading Difficulties.

Of course, if a child appears to be unusually dull to sound values in words you should suspect a hearing defect, and advise that his hearing be checked by means of a 2A audiometer or its equivalent. Most school systems do not possess this audiometer, so the child should be referred to a private physician.

We have been successful in helping a boy in fourth grade with a 15% loss of hearing by using the blending method described by Stanger and Donohue. This case may be one that is unique, because it is generally conceded that a visual method, one that employs the picture-dictionary idea to fix the basic vocabulary, is apt to be more successful with hard-of-hearing children.

Among these retarded reading cases there is a surprising inability to discriminate between the sound values which we call, popularly, the short vowels. Try this with boys in the upper grades. Pronounce a series of three -letter words whose only difference is a vowel change. Ask the pupil to write them.

hat	hit	hot	hut
bat	bet	bit	but
bad	bed	bid	bud
sat	met	sit	

Or, ask him to write hat and change it to hot, then hit, etc.

Discriminatory powers among consonant values can be sensitized by this same simple device - hit, change it to bit, now to mit, to sit, etc. Note that the consonants change.

This device is an effective developmental device to incorporate in a beginning - reading bag of tricks.

A proportion of these children who are clumsy in utilizing phonetic clues also exhibit another weakness. They seem to recognize the word as to its configuration; they know that they have seen the word before and may be able even to recall the situation in which they have met it, but are unable to recall the exact word - I recall an eight-year-old girl who manifested this difficulty when she would puzzle, "What is that word, I know it. It's the one we had with silo, but I can't remember it." It was the word barn. Or she would say, "What's the name of that animal that eats nuts?", when she was groping for the word squirrel. Again, a child with this weakness is the one who can write a list of spelling words correctly and not be able to pronounce them afterward. This type of difficulty is described as a weakness in auditory memory. It is a decided block to one's profiting from the instruction in a traditional phonics class in second or third grades. I have known these cases to be able to memorize a jingle or a short poem in a short time, but have difficulty repeating in the order given, three such words as mat, mit, met. We have helped cases of this type in this way. First, three words containing some identical sounds are pronounced to the child and he is expected to repeat them exactly as they were given. This step is repeated with different groups of words, and continued until the child performs orally as expected. The writing step is not introduced until after the ability to repeat orally has been pretty well established. The oral help can be extended through having the child repeat in reverse order two or three digits that are said before him orally. When he is ready for the second step, three words with some identical sounds are pronounced and he is expected to write them in the order in which they are given. He recalls each word aloud before he writes it. It may be that a pronounced weakness of auditory memory has a physical basis.

The simple remedial devices which I have described are those related, in some degree, to that part of the reading program which teachers experienced in beginning reading recognize as phonics. So, you may wish to ask, "Does this mean that you believe in teaching phonics?" Yes, just as I believe in teaching children to guess sensibly at words from the meaning of what they are reading, or as I believe that we must be extremely open-minded to methods by which the child may be helped to understand the mysteries of sound values in words. The very children in your second and third grades who are the stupid ones in utilizing phonics are the ones who should awaken your determination and tax your ingenuity heavily to teach them these tricks with words. I am reminded of a second grade which I was invited to visit about four years ago. This teacher was giving a demonstration lesson in phonics, using the word lists in the back of the old Beacon Readers. The children's procedure was something like this. "Ai says a, train;" next child, "Ay says a, tray;" third child, "Ea says e, treat;" etc., around

and around the class for twenty minutes. During this time I could not help but notice that five of the children in this class of about thirty did not participate. Their books were open, but during each time around the class these five were skipped. Naturally, when we visitors were given the opportunity to ask questions, I could not refrain from inquiring as to the reason for their lack of participation. Were they new to the class? Had they been absent, or were they perhaps so clever in using phonetic clues that they did not need the practice? "Oh, no," the teacher answered. "They're just too dumb to get it. I can't be bothered with them!" Quite the contrary. These are exactly the five children for whom we should tax our ingenuity and into whose cases we should go more deeply in order to find the causes of the difficulty.

I try to be open-minded on the different systems of teaching phonics. It seems to me that with the children who have no pathological handicaps, it matters little whether one uses a final blend approach in phonics (the final blend is often called teaching the families of words), or whether one uses the initial-blend approach, or whether children are taught to look for a familiar element within the word and proceed forward and backward within the word from that point. But, with seriously retarded readers, I have gained from observation this fact - that a method that starts at the beginning of the word and follows the word through in its exact left-to-right order appears to straighten out their difficulties better than do the other approaches. Teaching them to look for families at the end of words or to spot a familiar element within the word so often causes reversals of letters or causes the omission and addition of sounds within the word.

With all of this emphasis upon phonetics, you may wonder if we ignore the building of a sight vocabulary. No, we do not. It has been a help in the remedial groups of the upper grades to have had the 220 basic sight vocabulary list by Dolch. These words may be written on cards, and games like Snap or Read-o organized with them in order to teach them as "one-look" words.

I have emphasized largely word building devices and I may be leaving with you an impression that a child's school life in our reading program is quite a barren one. I chose to describe these devices and procedures, rather narrow in scope, chiefly because they are not being discussed elsewhere. Younger, inexperienced teachers are not hearing of them, and yet I observe that many of them are floundering for want of some of these rather prosaic helps. I shall have to assume that you understand that our program is sufficiently modern that it includes many broadening and interesting reading opportunities for the children, that we recognize and utilize in our social studies program reading materials differentiated as to difficulty, that we use films, picture strips, and other types of visual aids, that our children go on excursions in buses provided by the school and also with their parents, that they have in school many experiences with cultural and socializing values.

Part III

Evaluation and Summary

I have described one plan whereby the seriously disabled reading cases of an elementary school system can be brought under control.

Essentials fundamental to a remedial program efficient in the present decade are

1. The services of a school psychologist in order to help sort the seriously retarded reading cases from those that are only slow learners.

2. Educational leadership "on the ground", in order that training of teachers in remedial techniques may not only be encouraged but put into effective use once teachers have these added specialized services to offer. Superintendent or principals can exercise this function, but someone is needed to hold the program together.

3. Teachers trained in the techniques of diagnosis and remediation. Techniques that are effective are not so technical as to be out of reach of the regularly employed personnel.

4. Administrative backing of a material as well as of a spiritual nature.

By way of evaluating the program described, I offer statements based upon comments by principals and teachers who are working in the program.

1. There is a feeling of accomplishment, of satisfaction in doing something about these problems. One principal said, "Except for children who may transfer to us from out of the city with such problems, we will have no serious cases to be opened next fall in the upper grades."

2. The two strongest "practical" points of a preventive nature in the program are (a) the changed primary reading program, (b) that of having the regular teacher handle her own cases.

3. Relieving the regular teacher to work with the cases for a given period of time helps to make the goals of the special instruction attainable.

4. The program is a heavy one for teachers, taking toll in strength and energy.

5. The additional burden on the personnel may be justified on the ground that this approach has cut down <u>significantly</u> the number of children needing special reading instruction.

6. The work of the teacher responsible for relief teaching requires supervision, giving additional duties to supervising principals or other officials.

7. Our remedial program is relatively free of those cases of slow reading which are actually cases of slow learning. The inclination on the part of teachers to ;place in the special help class all the children who have difficulty adjusting to the class program has changed.

8. The limitations of a program of special reading instruction are better apprehended. Special reading help will not solve all the problems of an educational program.

Finally, as teachers themselves learn a scientific approach to these problems and apply their knowledge under sympathetic and intelligent leadership, there is a zest for all reading teaching that makes it efficient, and an attitude toward remedial teaching that makes it challenging and makes it fun.

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Monroe, Marion. Children Who Cannot Read, The University of Chicago Press, Chicago, Illinois, 1935 $2.50

Monroe, Marion, and Backus, Bertie Remedial Reading, Houghton Mifflin Company, San Francisco, 1937 $1.50

Stanger, Margaret A. and Donohue, Ellen K. Prediction and Prevention of Reading Difficulties, Oxford University Press, New York, 1937 $2.00

Teacher's College, Reading Aids Through the Grades; Word Enrichment and Recognition, Teachers College, Columbia University $..75

READING MATHEMATICAL MATERIAL

Gordon Richmond Mirick and Helen Cook Mirick, Lincoln School
Teachers College, Columbia University

When asked to give a talk on mathematics and reading, my first thought was that it would be interesting to show how mathematical ideas permeate our reading and for that matter our daily experiences. If we were to underline with red all the words and phrases which have to do with numbers, or measure, or any other type of mathematical expression in a random sampling of recent newspapers of the vicinity, you can readily see that the paper would be "black and white and red all over." Examine some papers critically for mathematical content.

However, the exact title for my talk today is "Reading Mathematical Materials," and since mathematics and precision are so closely allied, we must hew to the line. In the first place, we must agree on a definition of reading. We often think of reading as interpretation or getting meaning from the printed page. It is that and <u>much more</u>; it is putting meaning into the printed page, for interpretation is a function of past experience. Generally speaking, reading means the interpretation not only of the printed page but of any phenomena. The colors in the setting sun have definite significance to certain scientists. The unique tracks of different wild animals, the varied calls of the loon, and the moss on the trees are of especial importance to the trapper in the woods. If in walking in the evening, you see the big dipper and by tracing through the pointers you finally locate the North Star, you know that the direction is north but someone else who has a greater background of experience can see that the angle of elevation of the star is the latitude of the place where you are. In the same way, you may see areas of light and shadow on an X-ray picture; the doctor may see those same light and shadow areas but his experience enables him to read much more into the picture and thus he makes an interpretation of significance. Many people have for a long time considered reading in its broader sense.

In the first chapter of <u>Reading in General Education</u>, An American Council on Education book by W. S. Gray and Others, this definition is given: "Reading is a form of experience which contributes to the intellectual and the emotional growth of the individual. As such it is not an end in itself. Its general function is to work in concert with all other forms of experience in furthering the development of the reader".

Dr. Peter L. Spencer, Professor of Education at Claremont Colleges, has very appropriately framed this definition: "Reading is discriminative reaction to any stimuli ."

And what is mathematics? Bertrand Russell says, "Pure mathematics is the class of all propositions of the form ' p implies q,' where p and q are propositions containing one or more variables, the same in the two propositions, and neither p nor q contains any constants except logical constants." But since we may not know our p's and q's in this connection or since some

of us may not have a sufficient background of experience to interpret this definition, let us consider a definition more appropriate for the layman.

Mathematics is a way of thinking. Dr. Gray says that "reading, language, and thinking are intimately related."[1] If thac is true then reading, language, and mathematics are interrelated. And we have every evidence that mathematics permeates all of life's experiences. Dantgig says, "Mathematics is not only the model along the lines of which the exact sciences are striving to design their structure; mathematics is the cement which holds this structure together". Plato has said, "God eternally geometrizes". We certainly have evidences all about us that God has constantly and consistently made use of mathematics.

Now what is meant by mathematical materials? We may think of them in the narrow sense as the examples, problems, theorems, and originals which we find in our schools. But we must go further. Here we must give a broad interpretation and we must include any informational and quantitatively descriptive material and any tables, graphs, diagrams, charts, blue prints, working drawings, maps and instruments for measuring and computing such as the slide rule, vernier, clock, sun dial, transit, sextant, calipers, fire finding apparatus, and the like.

Let us begin with arithmetic and follow through some of the main branches of mathematics as taught in the schools. Then if time permits we shall discuss the reading of instruments of precision and other mathematical materials. In arithmetic we commonly think of reading problems but before a child can do that he must have some idea of numbers and their uses. The child's concept of number grows out of natural experience with objects that he handles and with things that he sees, hears, and smells. He must make discriminative reactions in respect to single objects, to groups of like and unlike objects in various arrangements, to parts of objects, to pictures of objects, to word symbols and to number symbols, and in respect to mathematical relationships. It would be impossible to give here a complete discussion of number concept -- that would take a long time and whole books are written in regard to it. But it is possible to give some indication of the number concept as a child gets it through natural experience. These steps may not be in the order in which you have seen children get number sense, but the fact is that no two children get their ideas in identical ways. This analysis based on the work of several authorities and upon personal observation and analysis of children's activities as well, is more detailed than most analyses but it should be helpful:

1. A sense of this and that.

2. A sense of oneness.

3. A sense that there is something more than one (one and another).

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[1] Gray, W. S., Reading in General Education, American Council on Education

4. A sense of a group.

5. Recognizing the difference in sizes of groups.

6. Recognizing groups of the same size (very small groups).

7. Rote counting from hearing and helping others count.

8. Learning the number names and their order.

9. Counting the numbers in a group. (1 to 5 and 1 to 10).

10. Recognizing at sight the number in a small group.
    Actual objects, pictures of objects, dots and lines in
    Different arrangements
    - Quadratic
    - Linear in varied directions
    - Triad
    - Miscellaneous

11. Picking out a certain number of objects from a larger group.

12. Representing a certain number of objects.

13. Appreciation of the size of groups and of the fact that 5 is 1 more than 4 and 1 less than 6, etc.

14. Making two groups equal (1 to 1 correspondence).

15. Recognizing the fact that number is abstract, it is the answer to the question "how many?" and it may be applied to any group of objects or things, -- that is, that 4 may be applied to apples, oranges,houses, hills, clouds, storms, years, or what have you.

16. Recognizing the written words -- one, two, three, four, five, etc., which stand for different groups.

17. Recognizing and writing symbols for groups.

18. Appreciation of the relationship between groups of objects, number patterns, words, and symbols.

19. Ordinal numerals -- first, second, third, fourth, fifth, etc.

20. As larger numbers are dealt with, an appreciation of place value.

In addition to growing in the number concept, the child is learning what it means to measure, for in the things he sees and makes there is much opportunity for this experience. He is also learning what operations of arithmetic mean. Through actual experience with objects he learns that addition means putting things together to make a whole and subtraction is decomposition (taking things apart). We use subtraction to find what is left, to compare, and to find what must be added to a certain amount to make

a larger amount. The child learns that multiplication is a short way of adding when the groups are all alike and that division is taking a part of something or separating it into equal groups and that it may also be considered continued subtraction.

The child must not only become discriminative in regard to relationships between numbers but in regard to relationships between operations. If the number concept is taught objectively through incidental and planned experiences and if the meaning of operations is thoroughly taught, then there will be no excuse for such a predicament as the following:

A small girl in the sixth grade described her method of solving arithmetic problems as follows:

> "If there are lots of numbers, I adds. If there are only two numbers with lots of parts (digits), I substracts. But if there are just two numbers and one littler than the other, it is hard -- I divides if they come out even, but if they don't, I multiplies."

General reading of printed material may be cursory, that is just for the purpose of getting the gist of the matter to be read or it may be critical. Reading of mathematical material is always critical because precision is of the utmost importance. Paul Washington Terry made an elaborate investigation of reading arithmetic problems.[1] He found that there are two types of reading in problems, -- textual and numerals. A different type of memory is called for in reading numerals because there is no coherence between numbers. Terry says, "When reading numerals, one divides the material to be read into smaller units. The reader seldom apprehends more than two numerals at a time. In a few instances, three are grasped at one time because they are grouped but this requires a wider span of recognition. On the other hand, twelve letters are often recognized. Trained adults read problems twice, once for the general setting and a second time to take in the numerals".

In reading problems in arithmetic, Osborn[2] lists nine reading difficulties encountered. They are:

1. Lack of vocabulary.

2. Failure to read or to see all the elements in the problem.

3. Failure to resist the disturbance caused by preconceived ideas.

4. Inability to read between the lines. (To use imagination).

5. Failure to understand fundamental relations, particularly those of the inverse type.

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[1] Terry, Paul W., How Numerals are Read (Supplementary Educational Monograph) University of Chicago Press.
[2] Osborn, Corrective Arithmetic

6. Failure to make a quick change of mental set.

7. Failure to generalize or to transfer meanings.

8. Failure to interpret cues correctly.

9. Responding to irrelevant elements.

No doubt some of these difficulties would be found in reading any mathematical problem or in any type of critical reading, for that matter.

In reading mathematical problems, several difficulties in connection with vocabulary may be confronted. The difficulties may have to do with vocabulary in general, with technical vocabulary, or with special mathematical vocabulary, or even with phrases where sometimes little words have a very particular and significant meaning. Following are illustrations of some of the non-technical words which might be met in problems and which may give difficulty if one is not familiar with the situation at hand.

realtor	irrigation	category	subsidize

Words in the next group are illustrations of words which are more or less technical in character and which call for familiarity with special situations.

speedometer	hygrometer	promissory	discount
liability	assessed valuation		

Below are only some of the words that are definitely mathematical in character and which require very specific interpretation.

addition	equation	point	sine
subtraction	identity	line	cosine
multiplication	linear	surface	tangent
division	quadratic	angle	average
perimeter	area	solid	mean
derivative	summation	integrate	

These are illustrations of phrases which need careful consideration:

Mr. Day bought 3 pictures <u>for $4.50</u>

Mr. Day bought 3 pictures <u>at $4.50 each</u>.

The difference in meaning between the underlined parts of the statements is a significant thing.

Perhaps you have heard the story of the small child who thought that the word <u>average</u> is a place where hens lay their eggs because in a problem she read "hens lay on an average". As a matter of fact, <u>average</u> is a mathematical word which may be used as a noun, as an adjective, or as a verb. A 1932 text book for the fourth grade gives this explanation about finding

an average:

Joan's father had been fishing three days.
He said, "I caught an average of nine fish a day."
"What does average mean, Father? " Joan asked.
"Well, the first day I caught twelve fish; the second day only seven, and the third day only eight. How many is that in all?" he asked.
"I get the sum of 27, Father. "
"I fished 3 days and you added 3 numbers, so divide the sum 27 by 3. If I had caught 9 fish each day I would have had the same number to take home. You can think of finding an average as taking some off of the large numbers to add to the small numbers so that all will be the same".

Here are problems illustrating <u>average</u> used as a noun, as an adjective, and as a verb.

1. Find the average of 27, 75, 92, and 86.

2. What is the average daily temperature for these four days: 66, 67, 58, 61?

3. Mr. Wilson said, "These horses average 1400 pounds. This one weighs 1450 lb., and that one, 1350 lb." Was he right?

It goes without saying that all mathematical problems should be carefully read to see what facts are given, <u>which of those facts</u> should be used in solving the problem, what other data needs to be gotten, and which facts can be left out. Below are suggestions for help in problem solving:

1. It is advisable to use a systematic method of attack.
   (a) What does the problem tell you?
   (b) What does the problem ask you to find?

2. Whenever you need to, use a diagram to help you solve the problem.

3. If a problem has many parts, break it up into simple little problems and solve them separately. A teacher can help do this by asking simple questions.

4. A more difficult problem can often be solved by relating it to a simpler one.
5. Be sure you know the meaning of each word.

In graph reading there are many points to consider:

1. What facts are being represented by a graph?

2. What type of graph is being used?

3. Where there are horizontal and vertical axes, what do these stand for?
4. What does each division stand for?

5. If the graph is a broken, curved, or straight line graph do the lines represent discrete points or trends?

6. Note the rate and direction of change of one variable with respect to another if the graph is a functional graph.

7. Read the facts which the graph shows.

8. Read into the graph what may account for these facts or trends.

9. Could a better type of graph been made to represent the facts?

Thorndike says that "Knowledge of the language of algebra has more vitality for education while skill in computing has less. The elements of the language of algebra are:

1. Alphabetical symbols.

2. Literal numbers.

3. Indicators of mathematical operations.

4. Directed numbers.

5. Methods of showing relationships(formulas, equations, graphs).

Alphabetical symbols are meaningless in themselves but through use, they acquire meaning. As Hogben[1] has said, "They correspond with collective nouns and the better sort of abstract nouns. In ordinary speech, such nouns save time and space. In the expression $n^a \cdot n^b$, n is a noun and a and b are adverbs. In the expression $x_a y_b$, a and b are adjectives. Literal numbers are even harder to read than digits and they are especially hard when they occur as exponents and subscripts.

<u>Plus</u>, <u>minus</u>, <u>times</u>, and <u>divided by</u> are the real workers of the mathematical sentence; they are the verbs.

The ability to understand formulas as expressions of relationships goes straight to the heart of all applied mathematics".

$A=P(1+i)^n$ is the compound interest formula. To some it is nothing more than a formula for finding the amount of money that will result when P dollars are compounded annually at a certain rate i. Others who are a little more advanced will see how to find the present value of a certain amount due n years later. However important these two results may be, there are other

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[1] Hogben, Lancelot T., <u>Mathematics for the Million</u> , N. Y. Norton

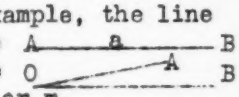
results which are even more far reaching and which can be obtained by the use of this formula. Some of these are the problems of annuities and if the amount is at continuous compound interest we have such formulas as $A=(Pe)^{rt}$. This formula and its modified forms solve many of the problems arising in science. Such problems generally go under the head of the law of growth. The number of bacteria in a certain culture increases continuously at a rate per hour which is always 12% of the number then present. If the original number is 1000, how many are there after ten hours?

A building is assumed to decrease continually in value at the rate of 8% a year. If P is its present value, its vslue n years from now is Q where $Q=Pe^{-.08n}$. After nine years its value is $Q=Pe^{-.72}$.

Other applications of the above formula are found in decrease of radium, progress in healing of a wound, etc. It is the opinion of the speaker that in a second course in algebra the compound interest law should be studied, together with its far reaching applications to the law of growth. In the study of this function there is a technique stage but much more than that, the correct use of this formula helps us read and understand the universe about us.

The inverse of the exponential function is the logarithmic function. This subject of logarithms involves reading of tables which is not just simple reading but interpolation. To illustrate, one can read directly the mantissa of a four-place number but interpolation allows one to obtain the mantissa of a five-place number. The understanding of this process is facilitated by the use of the logarithmic curve.

The whole subject of geometry involves many phases of reading. It involves reading not only figures in one and two dimensions but it involves readings used to picture three-dimensional objects. For example, the line segment at the right is read either line segment AB or line segment a. And this angle is read $\angle AOB$, or $\angle 1$, or in place of the number 1, there might be any small letter such as a or m.



The reading of solid geometry which has to do with three dimensional figures is even more complicated and involves very specific training and the use of the imagination.

The reading of geometric proofs and exercises is of a most meticulous type. Special consideration must be given to the hypotheses and to what is to be proved. From the hypotheses, the student may carefully construct his figure if one is necessary and read from it as he proves his theorem.

The reading of instruments of computation and measurement requires varying amounts of special training. Even to operate a comptometer, or an adding machine, one must be able to read not only number symbols but their place value. In the same way to read a caliper or thickness guage necessitates the ability to read decimals to a millionth part of an inch. The operation and reading of a slide rule may be very mechanically done but the person who understands logarithms will have a much better appreciation of the construction and use of the instrument.

Such instruments as the sextant and the transit involve special reading problems dealing with the measurement of angles. In connection with the two above named instruments, the vernier is used for greater precision in reading instruments.

To interpret the location of a fire by means of a fire-finding apparatus, one must have knowledge of the fact that the tangent is the ratio of the side opposite the angle to the side adjacent to it. Similarly in many other indirect measurements one must know the meaning of the sine, the cosine, and the tangent of an angle and how to interpret drawings and draw others to scale.

This brief discussion of some of the high points of reading mathematical materials indicates the extent of the field. If educators realized how closely language, reading and mathematics are associated in and out of school and how all of these activities permeate and direct our conscious lives, more attention would be given to the proper development and continuance of the three.

READING MOTION PICTURES

James P. Mitchell, Field Representative of Progressive Education Association, Commission on Human Relations, Motion Picture Project

There have been four main approaches to moving pictures in education.

I. One group, whose position in its more extreme form is now largely abandoned, denied the educational values of moving pictures, holding that they encouraged lazy thinking and did all the work for the students. Frequently they were very critical of the supposedly "pure entertainment" film as well as of classroom films, and were allied to censorship agencies.

II. Another group recognized the tremendously important part commercial moving pictures play in the lives of American adolescents (and pre-adolescents, for that matter). They proposed vigorously and in many cases have carried into fruitful action a program for moving picture appreciation in the schools. Students would view, together or separately, standard current productions, and the class then took up problems of plot, acting, lighting, sets, and, in the best cases, characterization and the nature of the moving picture as an art form.

III. A third group, one which is now and may be expected to continue very important, concerned itself with instructional films made specifically to teach arithmetic, geography, science, industrial processes, etc.. They also used commercial shorts designed for advertising purposes, and in fact a rather wide variety of films. Much time and research has been devoted to consideration of classroom problems involved.

IV. Since these three approaches are already very well known no extended discussion of them is needed. A fourth approach, resources for which have been generally available for only a year, needs more description. After several years of experimentation, the Commission on Human Relations of the Progressive Education Association last July released for use in educational organizations a series of fifty-seven 16 mm. sound films, excerpts running from five to thirty minutes, of standard Hollywood productions such as Alice Adams, Fury, The Story of Louis Pasteur, Ceiling Zero, and The Devil is a Sissy. These films were carefully edited to raise, not problems of appreciation or of factual instruction, but of basic human issues. They are intended to be shown in the classroom (though other showings are also possible) and to be followed by a discussion of those issues in human life which are in the minds of the students most significantly raised. The discussion thus is on students' own problems and experience, not on the moving picture as such; the latter is merely an illustration, starting point, stimulus. Questions such as these are brought up. What made her into that kind of person? What did he really want in life? How could this problem be solved? Do we ever act in similar ways? Why? What would you have done if you had known her during this period? Often the insight of young people into the motivations of human beings is profound and vital. At other times, when the need seems to be less for insight than for sound scientific information, it is necessary to go to other sources -- books, field trips, inter-

views, other films, etc. - to get further material. Frequently the desire to go into problems raised by the Human Relations series of films is so great that several weeks may be profitably spent as an outgrowth; at other times a single period of discussion seems enough, although usually there are many repercussions of one sort or another, from the athletic field to the art room.

B

There is value in all four of these approaches.

I. Even the first, much as most of us would consider it narrow, at least serves as a valuable caution against the merely passive approach to moving pictures, and makes us realize that, if they are to be used in a genuinely educational way, films must grow out of living activities and lead to further activities. The students need to be creative about the films which they see, and to add to them more than is shadowed from the celluloid.

When we approach films with the remaining three concepts of their educational uses, the idea of reading as "the process of making discriminative reactions", including "interpretation plus behavior developed in the interpretative process" seems very useful.

II. Valuable as the "appreciation" approach to moving pictures has been, it has, with honorable exceptions, lacked any real interpretation, and the behavior expected has been merely passive acceptance and enjoyment, with the addition of some criticism of technical qualities. At its infrequent worst, it is merely the introduction into the classroom of "Isn't Clark Gable wonderful?" Later it will be necessary to consider how the "appreciation" approach can be enriched and made more vital through the establishment of other, deeper, ways of looking at films.

III. Severe criticism might also be made of the visual education approach to films. In a brief paper it is impossible to review all the excellent aspects of work in this field, but some weaknesses need to be pointed out even at the risk of being unfair. Visual education heads have far too often thought of their jobs mainly as problems of technical organizations -- problems of training projectionists, organizing distribution, providing a maximum of showings. When they have concerned themselves with the educational growth of young people they have often set themselves the task of enlivening the corpse of a dead curriculum instead of seeking to find what new contributions the film can make and in what ways the whole curriculum needs to be reorganized. In fairness it must be said that many of them recognize these mistakes and are now correcting them. But in visual education there is still a marked emphasis on the idea that education is a process of acquiring factual information. This may be basically connected with the total content of our culture, and especially its form of economic organization. In our society, with its tremendous emphasis on private ownership, people are conditioned from the cradle to acquire things, stocks, bonds, real estate, gold, and to blazon their acquisitions in ostentations, clothing, houses, cars, and conspicuous spending . We exclude children and young

people, in the main, from this ferocious competition for things, and instead expect them to compete for items of information. The amount of education any individual has is likely to be measured in how much fact, regardless of its functions, which he has heaped up, just as the success of our adult is measured by the money he has heaped up. As long as this conception prevails, visual instruction will probably merely bolster with greater efficiency the prevailing practices of inserting items of fact (or lies, for that matter) into students' heads. Clearly this use of films does not involve reading them in the sense of "making discriminative reactions".

Interestingly, if the students are helped really to read films in this sense, then even the worst films which are used in the schools can become educational. For example, assume an advertising film designed to sell a patent breakfast food while pretending to inform about industrial processes. It may be a very crude example of its kind (but the slicker varieties, whose propaganda is delivered by indirection, are even more readable) and students may laugh at the pompous way it betrays itself. Still, this film may be approached with such questions in mind as, What is the real purpose of the film? Why do the producers give us the impression that they have an altruistic purpose? Is the propaganda based on truth? What elements, if any, of misrepresentation are present? How can we evaluate soundly the uses of this and other advertised products? What is, or what can be, the function of advertising in a democratic society? How can we as consumers and producers improve or eliminate the destructive aspects of advertising, or encourage the constructive aspects? And then a whole range of possibilities for reading and thought is opened. Facts do not lose their importance; they become much more important because they are essential to a valid understanding of the problems. They do cease to be ends in themselves; their accumulation into heaps for the size of the heap is replaced by their use for constructive purposes.

IV. These criticisms of other approaches to films might equally be made of possible uses of the Human Relations series. But these films in themselves teach nothing and advocate nothing. The educational values come in the understanding of our own and others' behavior, the enlargment of the areas we consider in accounting for the ways people act, the distinction between basic unconscious motivations of human behavior and the superficial rationalizations which we all produce, the discovery of better ways of human relationships. The educational values thus come not from the films themselves, but from the discussion and study which the films arouse -- in other words, from the reading of the pictures. The students themselves become jointly the scenario of all that came before the excerpt and of all that may follow it. They are the interpreters of the material presented, and they should be encouraged to act on the basis of their interpretation with the powerful drives which films can set in motion.

C

Some specific questions have been asked about the reading of moving pictures which this paper can answer only tentatively, through hunches and guesses evolved in three years of intensive work with the fourth approach to films. There is a wealth of research in the field, but most of it seems

inconclusive; we are still in the stage where we are raising and examining hypotheses. For instance, there is excellent research available on eye movements in reading a book, and Buswell's material on Looking at Pictures is well known, but if there are comparable studies of eye movements in looking at a film they are not known to the writer. We are probably justified in assuming that there is a marked difference in eye movements responding to moving pictures from those responding to stills or the printed page; this problem needs investigation.

I. How does the reading of moving pictures compare with the reading of printed word symbols as a mode of communication?

Most comparisons are still unknown. We do know, however, that there has been a tremendous influx into secondary schools (to use but one example) of people whose interests, needs, background of experience, have not educated them to a strong response to words on a page. The Commission on Human Relations believes, from its experience in the past three or more years, that when students have a common simultaneous experience with a moving picture, involving sound and sight in many different forms, they have a more powerful stimulus for discussion and study than is usually produced by mere printed words. The latter are very important, of course, and students often come to them with more desire to learn from them after work with moving pictures.

II. Do students have to learn how to read pictures in order to make such materials effective as educational instruments?

Yes. This answer has been implied by most of the preceding material of this article. With sound help students can learn the techniques of reading moving pictures rather faster than they learn words on a page. Unfortunately, too little attention has so far been given by teachers to the reading of human behavior as shown in moving pictures. The Commission on Human Relations directed its attention at the problem.

III. Is any picture as effective as any other in stimulating the development of ideas, attitudes, etc., or are there rather definite criteria which may be used to determine the educational value of a picture?

Clearly the latter is true, but the criteria have not yet been worked out. Suggested criteria are: (a) sincerity of approach (b) technical excellence (students are used to a high standard here, and hoot raucously and justifiably at the badly made instructional film) (c) suitability for raising questions rather than for giving answers (d) intimacy of relation to the curriculum as a whole. It should be noted that this does not exclude propaganda films. There is no danger in them provided teachers and students are aware of and sensitive to such content.

IV(a) Do students vary significantly in their abilities to read pictures? Yes.

(b) If so, do those who are relatively poor in ability to read printed word symbols show relatively different ability to read pictures? Very

often.

(c) Do individuals show different abilities with regard to reading different sorts of pictures?

Probably. The student whose life background has conditioned him to an amassing of scientific data may read the factual material of a film on the production of explosives with admirable clarity, though he may show no recognition of the social implications. The reverse may be true of a student with a strong social conscience and little interest in or experience with science.

(d) Are there students who may properly be classified as "reading deficiency cases" in so far as their abilities to read pictures is concerned?

No. The approach to students as "deficient" in any field is certain to cause the same sort of tragic failure that the I.Q. approach has caused in other ways. So far the moving picture field has not been especially corrupted by the essentially undemocratic and unjust assumption that some people are deficient. We must try to prevent the introduction into educational uses of moving pictures of this poisonous approach.

V. What is the relative value of picture reading as compared with other forms of reading in the developing of a valid program for the schools?

The relative values are so far unknown except by guesswork. What does seem clear is that none of the approaches are mutually exclusive, and that we must guard against the establishment of visual education as a separate subject-matter field with competing and conflicting interests to those of other fields. The reasons for emphasizing films are mainly centered around their previous neglect and their tremendous present importance.

D

None of these suggestions have any value unless they are part of a democratic classroom, or are a step toward a democratic classroom. And we must recognize that there is very little democracy in American schools. The teacher is up in front of the class as the fuehrer who imposes a program impressed on him or her by the administration. Most American education is fascistic, not democratic, and this prevents the real <u>reading</u> of anything at all. For unless students' and teachers' minds are really free from restraint and free to use all access to information, we cannot have democracy in the use of films or in education. The point is especially important in this time of increasing reaction, repression, war hysteria, and denial of civil rights.

Films, rightly used, can be a great help in extending democracy in the schools. This paper can only indicate very briefly three important ways; each of these deserves extended treatment.

I. The documentary film movement is making available scores of exciting

films which try to express the most important things about various sections of the peoples' lives and to suggest possible solutions. All teachers need to acquaint themselves, through such organizations as the Museum of Modern Art and the Association of Documentary Film Producers, with resources in the field. Especially interesting is the fact that in contrast to most films, documentaries are specifically designed to be read.

II. Students can make very important films, which perhaps will not be technically excellent or deserving of wide distribution. This subject is too important to be treated casually. Here we can only open up the remarkable possibilities for education in films made by students. They must decide, if they intend to make a film, on scenario, acting, direction, lighting, photography, commentary, music, and above all the use of available resources. The production of a film by a high school group can become one of its most important educational experiences, but only if the teacher is prepared to allow the students freedom to make their own picture.

III.A third, and perhaps the most important approach to the educational use of films has been made by Dr. Alfred Adler of Chicago. Many years may pass before this approach is fully used. The concluding section of this paper quotes his proposal:

Dr. Alfred Adler's Proposal

It has been said often, and Caroline Zachry's study seems to substantiate it, that adolescent youth does not have a specific function in our society. Children know just about what is expected from them; adults, alas, think they know what is expected from them. The adolescent, however, during the most formative teens is either pushed back into childhood by attitudes expressed as "you are still a kid, after all", or he is bullied into an artificial kind of porcelain adulthood, as if "he were a man already and should act like a man". He needs a specific function, and the fact that society does not have it in store for him constitutes a serious social problem very inadequately recognized so far -- not even by students of sociology of the type of those who put together the brochure on Some Contemporary Social Problems. Isn't it amazing that in the chapter on Channels of Information, namely, the newspaper, the movie, and the radio, mention is made that information, a matter of highest public interest, is still handicapped and distorted by private interest? Yet it is nowhere mentioned that the control of the nature of emotions aroused through these channels of information, is, ought to be, and might very well be, the specific function of adolescent youth -- the specific function of general education.

Considering this I recommend that the Commission on Human Relations extend its work on motion pictures in the following respects, and that it arouse interest in this extended program at educational conventions, especially at the National Convention of the P.E.A.:

(1) Organize interest in the "movies of the week" (in schools!)

(2) Organize and stimulate the discussion of the current movies. Let these discussions be encouraged to become a central nucleus of an integra-

tional program, in so far as the teachers of social studies, the arts, music, the drama, science, and the school psychologist together with guidance advisers would have to cooperate in understanding the emotional tone of the movies. Create the stirring awareness of the fact that these emotional tones are molding the nature of our actions as sovereign citizens.

(3) Organize panel discussions, and organize the cooperation of radio stations and of newspapers in order to make these discussions a nation-wide affair. This must be done, because the emotional tone created by the movies is also a nation-wide affair .

(4) Organize and encourage the creative wishing of students to re-write scenarios with the purpose to redirect the emotional tone of the movie towards a more inclusive and more adequate meeting of human needs.

I am not afraid of the fact that this plan implies competitive endeavors. The wisdom of discretion will have to be used.

Here is an example how the thing could work: Take a movie like The Challenge, a seemingly innocuous dramatization of the ascent of the Matterhorn in 1865.

The English gentleman Whimper has hired an Italian guide, Carel, in order to attempt to conquer the peak from the Swiss side in Zermatt. Carel (in the movie this Italian speaks English with a German accent, very much like Axis) is urged by his Italian countrymen to guide the Italian party from Broglio, the Italian angle of the mountain, because if the Italians win, the Italian hotels will be filled. The specific function of adolescent youth so far would be to come to the conclusion that here individual enterprise (the English, the Italian, the "neutral" Swiss side) is opposed to fascism ("Do it for Italy") Whimper is made to believe that Carel has left him. Carel is made to believe that Whimper does not want him. Carel, angry, joins the Italian party. Whimper goes in "free association" with a few other English gentlemen and a protestant minister. The English party arrives first, and the minister thanks "the Lord for blessing the enterprise". Is it necessary to point out what the youngsters would have to see here?

Now, the English party has to descend. They are all on one rope. One of them stumbles. The rope breaks. Four of the party die. Did Whimper cut the rope? Carel, jealous, wants to find out. All by himself he goes to find the rope. He finds it. It has not been cut. It has broken. Carel comes just in time to show the rope to a mob of madmen who want to lynch Whimper, although he had been acquitted by the judge. Ropes are not steel.

Ropes are not steel? Our youngsters would ask. So does that mean that you have to take your chances and risks when you go on an enterprise like a gentleman, in free "business" association ? And if you do not fight for your right of free enterprise, the madmen's mob will sweep you away? Is that it?

Assume that through a series of radio panels and articles issued by students this conclusion has been arrived at as to the emotional tone of this movie. A series of new scenarios might be attempted, creating an emotional tone apt to question the necessity of "reaching peaks" competitively; questioning also the validity of the alternative, free enterprise versus fascistic mob. Is there no other solution? Why do the English "gentlemen" not join the Italian party? Why does there have to be a national flag on the peak?

Yes, I do think that it is necessary and possible to work along this line. It would be a democratic attempt to synchronize the machine age-possibilities of communication with education. Germany is doing this -- badly. It can be done well.

PRACTICAL PROBLEMS IN WRITING FOR READING

Elizabeth Rider Montgomery, co-author of the new revised Elson pre-primers

The first books used in teaching children to read are such simple little things: so few words, such short lines, such simple ideas. To the uninitiated, the writing of these books is not writing at all. They think there is nothing to it. Even those who have taught reading and understand what good primers and pre-primers are, do not realize, until they have tried to write one, what a long, painstaking, brain-wracking task it is.

Quite a few of us, not only the authors whose names appear on the books but also a large part of a capable editorial staff, have been working for more than three years to produce the revised Elson reading materials for first grade. There are many different problems to face in preparing a reading program which will be used widely for several years. No one person can be an expert in every phase of the work. Therefore a number of people, each an authority in a different field, work together.

I will attempt to point out some of the work involved in preparing reading materials, some of the difficulties to be surmounted, so that teachers will appreciate a little more the books they work with. The problems, or groups of problems, are four in number: (1) the child; (2) the content; (3) the vocabulary; and (4) the illustrations. Each of these presents a very real problem to the writer of reading materials.

Problem 1
The child, who is the aim of reading teaching

The child is the aim of all teaching of reading, not only in the sense that he is the one for whom reading materials are written, but in the larger, more important sense that the maximum development of the child is the primary aim of teaching him to read. The ability to read, in itself, is nothing. It is merely another skill to be added to those which the child has been learning from baby-hood: crawling, walking, talking, feeding himself, and so on. But reading as a tool which helps the child to build a more vital personality and a stronger character -- reading as a key which opens to him a richer, fuller life: reading as such is of vital importance. Marian Monroe says, in Children Who Cannot Read :"Educators are no longer content to teach subject-matter and skills as ends in themselves, but rather as the means by which children learn to adjust successfully and happily to their life needs." And Paul McKee says, in Reading and Literature in the Elementary School: "Sensible reading has much to offer. It opens the door to a wide variety of significant experiences otherwise often unobtainable; it provides convenient opportunity for one to become acquainted with many of his responsibilities as a citizen; and it can be used effectively as a means of providing wholesome enjoyment of leisure time."

It is because of the things reading can do for him that we teach the

child to read. Hence, the child is foremost in our minds in writing for reading.

Then what must we know about children before we can write for them? We must know what children are like. We must know what equipment they bring with them to school that will help or hinder them in learning to read. We must know what will contribute to their ease of learning, what will contribute to their enjoyment of reading and to their mastery of it as a tool for living.

1. The child's background for reading

First, the equipment that children bring with them to school. Every child brings a certain level of physical development, a certain measure of native mental ability, and a certain background of experiences and concepts. If children were all alike in this equipment, our job as writers would be much easier. But it is widely recognized today that first grade children differ greatly in their physical development, in their mental ability, and in their experiential background. Varying physical development does not concern writers: there is nothing we can do about it. Varying mental development we meet by making our reading materials easy enough for the mental level that has been determined to be the minimum for learning to read. But the varying background of children presents a major problem to us.

The first materials that children read must be about things they understand. Mary E. Pennell, in her article in Volume 17 of the National Elementary Principal (July,1938), says: "Meaning can not be secured or stimulated through printed symbols unless the child brings to that material similar experiences gained either directly or indirectly." In other words, pre-primers and primers must present concepts and experiences that are familiar to children; for reading, which is a strange and new experience in itself, must not be complicated by strange concepts, new ideas.

Now, all children have seen things, done things, and heard about things before entering school. But they have not all seen the same things, or done the same things, or heard about the same things. The city child has a different experiential background from the country child. The eastern child has a different one from the western child. And the underprivileged child from a poor environment; the child from a broken home; the child from a wealthy home; and the child of parents in moderate circumstances.--all have seen, and done, and thought about different things. The problem that confronts the writer of reading materials, which are to be used all over the country, is to find concepts and experiences that are practically universal to children six years old.

2. The child's need for success and enjoyment in reading

As writers, then, we must consider the child's past: what has happened to him before he begins to learn to read. We must also consider the child's present: what happens to him as he is learning to read, and how it will

affect his future attitude toward reading. Especially must we keep in mind the importance of enjoyment and success. The two are closely related. The child must enjoy reading from the start if he is to continue it through life and utilize it to its fullest extent. This means that the content of his readers must be interesting to him, and reading must be fun. And since we enjoy doing only those things we can do, the child must constantly and increasingly be successful in his reading. Studies have been made showing the effect of success in reading -- or the lack of it -- on academic success, and on social adjustment. Several of these studies are reported in the Seventeenth Principal's Yearbook mentioned above. McKee, in his Reading and Literature, also reports such studies. There seems no doubt, in the light of these investigations, that the child who is a reading failure has little chance of success in most lines of school work (since ours are primarily reading schools). And there is much evidence to indicate that failure of any kind is apt to warp a child's personality, often resulting in serious social maladjustment. To quote again from Marian Monroe, "Educators who are interested in the mental health of children as well as in their academic progress should be especially aware of the need for preventing the behavior difficulties that result from failure."

On the other side of success-versus-failure, those who have taught children to read are familiar with the change that comes over a child when he first realizes that he can really read: how he swells with the thrill of success, with increased self-importance. Always, this awakening to his own ability gives the child new impetus in learning to read. He no longer needs to be taught; he needs only to be guided in his learning.

Obviously, then, it is vitally important for reading materials to be so easy and so carefully graded in difficulty that the possibility of failure in learning to read is entirely precluded. We must give the child that thrill of success, of mastery over the printed page, as early as possible.

So the first problem that faces us as writers of reading materials is understanding the child we are writing for, his mental level, his background, his need for success and pleasure in reading.

Problem II
Content, the medium of teaching reading

From a study of the child, it follows that the content of his first books must be interesting to him, and it must be comprehensible to all children, so far as possible. It must be equally interesting and comprehensible to Mary who lives in a city apartment, and to Ellen who lives on a big sheep ranch; equally interesting to John whose father is a stock broker, and to Jimmy whose father drives a garbage truck.

In addition, adults require that the child's reading material must be valuable in some way -- if only in increasing his appreciation of books and his joy of learning. Certainly, it must not be suggestive of undesirable behavior in health, safety, or ethical matters.

We of Scott,Foresman Company have a further requirement which we consider important: that all material used in our readers shall be real stories -- simple, necessarily, but genuine stories just the same, with setting, characterization, action, complication, and denouement.

1. Sources of material

How do we get materials that satisfy these requirements? We get our material from children. Most of my ideas I get from my own little daughter. Into my notebook goes everything that she or her playmates do that is interesting, funny, or just fun to them. Many things, of course, are never used, but I write down everything that has any possibilities at all, because sometimes items, unusable in themselves, suggest other usable ideas.

Then I draw on my years of experience as a teacher -- the memory of things first grade children always did, and always liked, and the things they thought were funny.

My third source of ideas is anywhere and everywhere I see children or hear about them -- on the street, at friends' homes, etc. Anyone who watches what children do, undirected, can find plenty of little plots for primer stories.

2. Developing ideas into stories

But after the ideas are in a notebook, they must be worked up in primer vocabulary before they can be submitted for consideration for use in the readers. Sometimes these notes are incidents that can be made, just as they are, into a story for early reading. More often, what goes into the notebook is merely a situation or a provocative idea that must be developed into a little story plot before it can be used. And very often the production of one of these stories is a cumulative thing, the product of half a dozen minds.

Frequently an excellent idea cannot be used at all because it simply cannot be told clearly in limited vocabulary. If the idea is such that it would interest an older child, it is put aside for use at a later level. Otherwise it is discarded.

3. Evaluating the material

After the material has been gathered -- material that is child-like and interesting to six-year-olds -- the next step is evaluating it and choosing those stories which satisfy our other two requirements: namely, that the concepts presented shall be understandable to children all over the country, and that each story shall be intrinsically good.

Studies have been made with a view to determining what children of a given age understand and are interested in. The findings of these investigations are of course valuable to us, as writers. In addition our company is in close touch with schools all over the country, and thus has a

sound basis for judging the suitability of early reading materials. So the stories gathered are weeded out: One idea which concerned a piano was eliminated because many children have no experience with pianos; any musical background they have is derived from the radio. Another story of an escalator would be comprehensible only to city children and consequently was thrown aside. And so on.

Next, the question of value must be considered. Since the stories are drawn from actual children's undirected activities, it follows that many of them are not good for teaching, since children often do things that (while interesting or funny, and perhaps not undesirable in themselves) would tend to teach wrong ideas.

Then, our Scott-Foresman material must be real stories, having all the attributes of a genuine short story. Even the first stories in the first pre-primer have these essentials: setting, characterization, action, complication, and denouement. So any ideas, no matter how good, are discarded if they do not contain sufficient plot or climax.

It is obvious that, by the time this weeding-out process is concluded, the supply of material has dwindled considerably. But at last the material has been evaluated, and we have a group of stories that satisfy our requirements, ready to be worked up into books.

Problem III
Vocabulary, the means of teaching reading

We are then ready to face the next problem: vocabulary. Perhaps to many this seems the most important part of writing primer materials. However, to begin with the vocabulary and to keep it paramount in your mind is to put the cart before the horse, and to defeat your own end. Vocabulary is but a means to an end: the means by which we teach children to read, through the medium of attractive story content. This isn't to say vocabulary is not important. It is vital. And there are very definite requirements that the vocabulary of a primer must meet.

1. The vocabulary must be limited.

Not only must the total number of words used in the book be low, but the words must be introduced very gradually, preferably only one new word to a page -- certainly not more than two at first. This is not easy. But it can be done with the aid of pictures. (We will take up the matter of illustrations later.)

2. The vocabulary must be maintained.

It is not enough merely to introduce words gradually. They must be repeated, before the child has a chance to forget them, often enough to fix them in his memory. This vocabulary maintenance is very important. Experts do not agree as to how many times a word should be repeated in order to become a part of the child's sight vocabulary -- and probably, as Pennell points out, different words need a different number of repetitions .

But all authorities agree that a word introduced and not repeated several times is valueless. So we arbitrarily decide how many repetitions we think are essential and try to provide them without bringing in silly, inane repetitions just for the sake of repeating. Many writers consider five repetitions sufficient. McKee suggests six. We of Scott, Foresman have set ten repetitions as our goal, with each word repeated an additional ten times in each succeeding book of the series.

3. The vocabulary must be composed of familiar words

Merely to provide a limited vocabulary of easy gradation, with sufficient repetitions is still not enough. The choice of the words themselves is important. The words comprising the vocabulary of any early reading book must be words that the child knows -- familiar words that belong to his speaking vocabulary. We have already said that learning to read must not be complicated by the use of familiar concepts. In addition, it must not be complicated by the use of unfamiliar words. Since the process of reading is getting meaning from printed symbols, it follows that the words for which the symbols stand must have meaning for the child before the symbols themselves will have meaning. Hence, the vocabulary of the child's first books must be words that he himself uses in talking. Madeline Darrough Horn's word list, based on A Study of the Vocabulary of Children before Entering First Grade,(International Kindergarten Union, Child Study Committee,Washington, 1928) is valuable in this connection.

4. The vocabulary must be valuable.

Economic reading teaching must provide the child with a sight vocabulary that he can use with immediate and continuing success. The words used in his first books must be those he will use over and over again in his immediate future. They must be words that will be met in later books of the same series, and they must, so far as possible, be words that will be met in other books for the the same reading level. Vocabulary studies that have been made are of service here. The National Elementary Principal, Volume 17 (1938) mentioned above, contains an excellent summary of the best of these investigations. Most teachers are familiar with Gates' list, Dolch's and Thorndike's.

5. Other mechanical difficulties.

Along with the problem of vocabulary come other mechanical points to be watched. The size of type, the length of line, the simplicity of sentence structure, and so on. It would take too long to go into these points. Let it suffice to say that type should be large, lines must be short, and sentences simple throughout. McKee, in Reading and Literature in the Elementary School, gives a clear exposition of the criteria of a good primer.

Knowing these essentials of the mechanics of a good primer, then, we take our interesting, universally understandable story ideas, and proceed to build a book. And here we call in an indispensable aid: illustration.

Problem IV
Illustration, an aid to reading

Illustrations in early reading materials are more than just colorful attractive pictures to catch the child's attention and interest. They are a definite aid to reading. Pictures are a crutch to support the wavering steps of reading, to be thrown away as those steps become strong and self-confident.

In the beginning, the pictures practically carry the story, with the text accompanying and supplementing it. As the child's sight vocabulary grows, so that the text can carry more and more of the story, the pictures tell less and less, until at last the pictures are merely a means of enriching the story by adding details that the text has neither the space nor the vocabulary to describe. By the end of the primer this stage is reached. The child is no longer dependent on the pictures, but he enjoys them none-the-less.

Since pictures play such an important part in primary reading materials, it is worth while considering the requirements of primer illustrations, and what they have to do with us, as writers.

1. The pictures must be decorative.

The illustrations should develop in the child an appreciation of good pictures. When we consider that the Sunday funnies are the only pictures many children see aside from their school books, we realize how important it is that these books should present the child with examples of real art.

2. The pictures must be true to life, and up-to-date as well.

No merely artistic pictures will do if they do not depict life as the child knows it -- real children, real toys, and real pets.

3. The pictures must be true to the story.

Since the pictures carry a part of the story, they must be true to it. They must show action and feeling.

The writer's part in the illustration of the book is a vital one, although he does not, of course, do the actual art work. The writer must know what he wants in every picture, and he must express it clearly. These directions to the artist are an integral part of every page of the manuscript, and are almost as important as the text itself. Hence, the writer must be able to visualize the finished story, complete with pictures.

In this connection, it might be well to point out that the writer must keep in mind, as he writes a page, what is going to happen in his story on the next page. The child's mind must be prepared for the next step of the action. The complications and resolution of the plot must not come as a total surprise, or the child may miss the point entirely. There must be no gaps of comprehension in the child's mind. One page must lead to another,

surely but unobtrusively, so that the child keeps the thread of the story without having to stop and figure it out.

Problem V
Re-Writing

No exposition of the writing of reading materials would be complete without a few words on re-writing.

When the writer has studied the child he is writing for, has gathered and evaluated a great deal of material (far more than he will ever use), and has worked up that material into a book with easy, limited, maintained vocabulary, and with directions for illustrations, is his work finished? Not by any means! When the writer has done all that, then he is ready for the actual work -- the drudgery of making good text-books: re-writing. It is one thing to write something in the first flush of creative enthusiasm. It is far different to work over that same material, writing and re-writing it until no further improvement can be made. One learns something from each re-writing. Especially is this true when different minds, bringing different abilities, work over the manuscripts,as in our company. Thus the final version is as perfect as the combined wisdom of our experts and the painstaking work of the editorial staff can make it. Thus our books are able to stand the test of time and wide usage.

Is there nothing to the writing of these first books that children read? I have tried to demonstrate that there is a lot to it: a lot of study, and a lot of work. But there is also a lot of fun. Writing for reading is truly a challenging and interesting occupation.

A CLASS ROOM APPROACH TO READING DIFFICULTY IN THE JUNIOR HIGH SCHOOL

Gordon Park, Principal, Sturges Junior High School, San Bernardino

I do not bring you any magic key to the reading problem. If there be such a key will one of you please pass it to me after this session?

Rather, it is my purpose to set up certain fields of reading difficulty as they have appeared in my work as a Junior High School administrator; through examination and analysis to reduce these fields to specific deficiencies; and by a realistic approach, to retain for consideration only such deficiencies as the classroom teacher may hope to correct; to set up certain specific indices of behavior on the part of pupil which may serve to identify the deficiencies to be corrected; and to propose a pattern of approach to the problem of teacher activity in relation to the work to be done.

The educational world has in late years become increasingly conscious of the importance of reading especially in its relationship to the student's ability to succeed in other school subjects. Analysis of causes of failure in a large number of cases have seemed to point to:

I. The inability of the student to read sufficiently rapidly to maintain his place in competition with others.

II. The inability to get accurately facts or instructions from the printed page.

III. The inability to follow reasoning and to transfer to himself the problem and thought process of the author.

IV. And, related to the above, the inability to appreciate; to participate vicariously in, or react to, the emotional and intellectual stimuli which the author has attempted to create.

These causes may not be considered to occur singly or in a pure state in the history of failure of any given pupil nor to exhaust the field, but it is my observation that one or more of them exist as a major cause in each case, it being supplemented to a greater or less degree by other satellite difficulties.

I.

Much importance has been placed on the first of these deficiencies - Lack of Speed. Tests have seemed to prove conclusively that the rapid reader also is the retentive reader and therefore our work in the schools has been devoted in some part, to the improvement of the individual mechanical technique of the slow reader though in a greater part mere pressure for speed has been applied and the added increment of retention fondly hoped for.

While recognizing this correlation between speed and retention I am

inclined to believe that for the most part power to read rapidly does not of itself give power to retain information but rather that these two qualities spring from a single source or rather a related group of sources; the physiological, psychological, and mechanical efficiency of the individual.

If this be the case, simple pressure to increase the reading rate might well be inclined, under certain circumstances, to reduce materially the ability of the pupil to retain. Such cases as I have the opportunity to observe would seem to bear out this hypothesis. Therefore, both values would seem to deserve coordinate consideration in any program for reading improvement. More especially is this the case when it is realized that the desirability of a high reading rate (as a specific objective) is based largely on the needs of the individual as he exists in the school situation and not on the needs of most of our pupils as they are, or as they are likely to be, in out of school life.

To the end, then, of avoiding the destruction of other values, the teacher who wishes to increase reading rate should forego the quick gains so readily obtainable through simple pressure for speed and try to identify the physiological, psychological and mechanical factors which form the basis of the child's reading speed ability.

This entails a careful study of the child in relation to his reading habits and a careful selection from among those characteristics which have been noted and in which a change is to be desired.

For example: Very little can be done by the classroom teacher to measure eye span accurately, while attention span can be rather neatly demonstrated with the Morrison attention profile as a device. Again: certain characteristics denoting physical disability may have to be followed through auxiliary agencies, as for example the teacher on discovering a pupil who habitually holds his book at an unusual angle or distance must suspect the child's eyes need attention and should, after ruling out temporary local conditions as a cause, see that the school or the family doctor makes further diagnosis and correction. Such manifestation of physiological deficiencies or maladjustments as over active body, pronounced tenseness of body, frowning or rubbing the eyes, come under this category.

In the field of psychological adjustment, the teacher herself is very often the best person to discover the cause of maladjustment and working through the home, the playground director, other teachers and administrators, and with the cooperation of the child, may bring about the change desired.

Psychological deficiencies may be closely associated with physiological lacks and may manifest themselves in a similar manner, in which case the school doctor and the teacher should work out a program together. On the other hand, a decided distaste for reading, short attention span, etc., are psychological and more completely within the province of the teacher.

Mechanical efficiency in reading is exclusively the teacher's field and while "trick reading" is productive of good results when used intelligently, in my opinion the teacher should abstain from teaching such methods

short of the junior college level and rather devote herself to the identification of the specific mechanical traits causing the inefficiancy.

Thus, such factors as observance of light, angle and support of book, seating and position of body, phrase reading as contrasted with word reading, the handling of new and difficult words or arrangements of words in the text of the material being read, give the teacher ample scope for detailed diagnosis and identification of deficiencies for the eradication of which she may set up specific activities.

II.

Maturity, general intelligence, and apperceptive mass appear to play major roles in the ability of the individual to gather facts and instructions from the printed page. Maturity contributes to readiness for reception of the facts or directions, to a greater attention span and to a more stabilized nerve control. Greater general intelligence facilitates recognition of points and relationships, and apperceptive mass presents the necessary background against which the new material may be flashed and in terms of which it may be interpreted.

In considering this phase of reading difficulty the Gestalt psychology appears to have special significance. There are four points to this psychology, as I see it, in application to the present case.

A. The reader must recognize a valid need for acquiring the facts or mastering the directions to which his attention has been directed.

B. The reader must gain an insight into the situation in terms of:
   1. The whole situation and
   2. The inter-relation of the parts of that whole situation which go to make up its totality.

C. The reader must recognize that the whole situation is greater or of more significance than the listing of its several parts, the increment being the inter-relationships.

D. The reward for learning must be inherent in the learning situation itself.

The application of this psychology to reading for facts or instruction would eliminate much of the rather frantic drill methods in which a page of material is presented to the reader together with a series of questions on that material and for which the student is asked to find the answers. Such methods probably do yield gratifying advances in reading grade placement as measured by standardized tests but it is my observation that they do little to increase the essential functional power of the individual to follow the mind of the writer through the medium of the printed word.

Since the correlation between maturity of mind and ability to value remote goals has been well established it would seem that at the junior high

school level the processes of instruction should be directed toward the achievement of rather immediate values. Hence the student must want to have and to use the facts or directions toward which his attention has been directed. The teacher's problem then becomes that of:

1. Setting up suitable student activities in which the pupil might be eager to engage because of the values inherent in those activities and for the accomplishment of which reading for facts or directions must be done:

2. Setting up activities on her own part calculated to get the pupil to engage in his own growth promoting activity:

3. Setting up a plan of self check so that the student will come to recognize the value of mastery of his material in relation to the thing he wants to do.

Through the wise pursuance of this plan each teacher with whom a given junior high school pupil is registered may advance that student's growth in subject matter and at the same time build soundly one of the most essential tools of learning: skill in reading accurately for facts or directions.

III.

I have observed little activity directed toward the alleviation of the inability of students to follow reasoning and to live the problems and work through the printed thought processes of another. Here again, our demand for speed, our competitive system whereby the greatest value is placed getting the answer and getting it first, comes into conflict with our ultimate goals: in this case a reasoning or critical appreciation.

In neglecting this field of training we allow our pupils to remain ill equipped in two ways:

1. Our language, especially as it is used by most of us, is not adapted to precise logic, and therefore in order that we may read as accurately as possible the thoughts an author wishes to convey, it would seem desirable for the reader to be, for the moment, the person writing and to be that person surrounded, in the imagination, by the conditions which have caused him to write as he did. Should we fail to teach our pupil to approach a course of reasoning in this way, the thoughts presented by the printed page must in many instances remain incomplete to him.

2. The stimulating effect of academic discussion, of dialectic, is lost to the person who reads only for the answers and with it is lost the most potent element by which his own powers to produce may be trained, and therefore the person untrained to follow understandingly and critically that which precedes the conclusions loses not only much enjoyment but must forego a major growth-promoting activity.

It is the teacher's job to sell these values to the young reader and, that she may be encouraged to do this, those people whose approbation the teacher regards must make plain their appreciation of the values in this type of activity.

It is not enough for the pupil to be able to recite the important conclusions brought forth in chapter five of the green book. Pupils and even teachers are found to be prone to think of their texts as "the green book", "the red book", etc., rather than in terms of another title or subject. He should know about the author, what he was trying to present, why he was doing it, and how he came to his conclusions.

The question of appreciation becomes of greater importance when it is realized that with the wider range of abilities now included in our schools, a high degree of mastery cannot be hoped for in the case of a large number of our pupils. Therefore we must be content if we are able to build attitudes, ideals, and appreciation for them.

However these things do not "just happen" (i.e., not the desired ones) unless special work is pointed toward that specific outcome. For example:

Studies have shown that college students apparently read worse literature than do high school students. Studies of examinations given by some 2000 teachers were said to have established that fact.

The "re-statement of principles" was the most valued contribution, according to teachers' rating, which students could get from their courses.

Many of our teachers are inclined to give only lip service to the teaching of appreciation or to hope for it as a by-product of the more easily measured mastery of facts, even though our psychologists tell us that there is no transfer from fact learning to appreciation.

It is true that the nature of "Appreciation Ideals and Attitudes" is intangible in character. However, mental attitudes must express themselves if they exist. Therefore the test of one's success in teaching attitudes is what the learner does on his own. For example:

A. In science it should express itself in respect for scientific investigators; of objection to scientific quackery; and show in the kind of books read.

B. In history it should show itself in a desire to know more about some social or political questions. N.B. It is interesting to note that many of our super-grafters ranked high in their factual knowledge in social studies in school, though apparently their attitudes had not kept pace.

There are certain obstacles which appear to me to interfere most frequently with teaching for appreciation:

A. Difficulty of comprehension: the student cannot appreciate the

"Stag at Eve", etc., if he does not know what a stag is. The teacher must teach for comprehension as well as appreciation. However, unless the step to comprehension is easy she had better be allowed to change the curriculum, for the appreciation values are likely to be lost in any great struggle for comprehension.

B. Effective maladjustment because the materials are selected by adult standards: It is difficult for the teacher to put herself in the child's place when selecting materials. However, to do this she must.

C. As stated before, the competition from other types of knowledge because they are easy to recognize and to test. We all tend to do that which we do best and so it is in the classroom. Most teachers can teach facts best.

D. Appreciation objectives encourage aimlessness through their nebulous quality. Some of our pseudo-progressives can and do waste much class time with ill prepared class activities which have appreciation objectives.

E. The difficulty found in measuring appreciations causes us to measure only those things we can. However, in doing this we place undue emphasis on the importance of those things which are measurable.

F. Appreciation defies the grading system, for there is no appreciation without feeling and emotion; mere performance does not give it.

A review of the implications inherent in the observations which I have been able to make concerning the development of interest and appreciation, points even more strongly towards a relaxation of tension in the class-room and toward a realignment of values, to the end that the rewards to the teacher no longer are sought in advances in grade placement reading ability as measured by standardized tests, but rather in the real changes in attitudes and appreciations of her pupils; and that the rewards offered to the student are shown to exist in his having lived and shared life more broadly through reading.

It is my hope that I shall see a return to popularity of the reader who lingers over the beautiful passage for the music in it; who stretches his mental muscles through review and cogitation on an intricate discussion, and who lives and laughs and loves with old friends taken again and again from a handy shelf.

VISUAL EFFICIENCY IN RELATIONSHIP TO READING ABILITY

Henry B. Peters, M.A., Opt.D., Instructor, Los Angeles School of Optometry

It is my ardent desire to contribute in some small way to an understanding of the relation between visual factors and reading disability. The discussion to follow presents a point of view that has developed from my under-graduate study of optometry at the University of California, in research and study in educational psychology at the University of Nebraska, and in continued work at the University of California at Los Angeles and the Los Angeles School of Optometry. With this varied background, the concepts I have formed have been of great value in the investigation and treatment of reading-problem cases in our clinic.

As an optometrist and an educator, I am interested in providing adequate, comfortable, and efficient vision for the child; adequate in the sense that full use of the eyes in physical, physiological, and psychological processes is assured. The physical retinal images are clear, the coordinated activity is present, the peripheral limitations to perception are eliminated.

I am interested in comfortable vision for the child. Comfort as freedom from headaches, freedom from excessive fatigue conditions, freedom from over-sensitivity to light, -- freedom from many of the undesirable, annoying, and painful symptoms that may be caused by defective vision.

But from a utilitarian point of view, I am interested in efficient vision. Can the child perform those acts of visual functioning required of him in the school situation to the degree and in the time designated? Can he read up to or above his expectancy, or is some peripheral limitation holding him back? I do not wish to over-emphasize the peripheral factors in reading, as I am sure we all recognize the many other factors which contribute to this act, but just as cerebral development may retard its growth, so may sensory or peripheral factors. In the classroom we are not concerned with whether or not a child can perform any of the tasks he may be called upon to do in an optometrist's office. We are concerned with the efficiency of his visual mechanism in the school situation.

The child acts in an organized manner, as a whole. And if we are able to assist this organizational process in any way, we are doing a service for the child. Now it seems probable that the teaching of outlining and other categorizing techniques will help this organizing process from a central point. But more easily reached are the peripheral factors and they are equally important. By the proper therapy we can provide better visual performance in the reading act.

It is the adjustment of the organism to the task that counts. If the task becomes too great, and the individual cannot cope with it, some modification in function takes place. This is the source of many cross-eyed conditions and other such anomolies. The strain of maintaining binocular vision is too much, so the child surrenders this and proceeds to function with less difficulty with only one eye. The sacrifice of depth, perception, and

many other binocular acts is compensated by the decreased strain. Such things do happen in the school under the intense visual activity in reading. We need to know the visual limitations of the children entrusted to our care.

Let us now turn directly to the field of reading disability.

Before launching into our attack on reading disability, I would like to clear up this concept. We must realize that there is no dicotomy in reading ability. All readers do not fall into two groups, either good or bad, but vary only in degree of certain measurable aspects of reading. They vary in speed of reading on a given amount of standardized test material, but there are individuals spread over all the scores (all the rates) from the highest to the lowest. Reading ability is distributed similar to height, in a normal distribution. That is, there are many individuals at the average, and the number at any height decreases as we leave this average and go toward the extremes. There are only a few very tall persons and only a few very short ones. Similarly there are few very fast readers and few very slow ones, but it is important to understand that there is no line of division between them. The number of individuals we designate as reading disability cases, therefore, will depend on where we draw the line between readers of passable ability and those considered disabled. A disabled reader therefore is one we designate at the lower end of the scale of ability. Obviously there are readers at the lower end of the passable group that are very similar in ability to those at the upper end of the retarded group.

Armed with these concepts we are now prepared to examine some of the experimental work in this field. Most of these investigations have been founded on a study of parts and comprise what I choose to call 'The Measurement Method'. By this I mean that many studies have been devoted to the measurement of a number of visual factors and a number of reading performances with an attempt at correlating visual errors with reading disability. Single items were taken as important and the search was on for the one visual error that accounted for all reading disability. This attempt has been marked by many failures.

I am not going to attempt to review for you, at this time all the experiments on the relation between visual factors and reading ability. And though I have on file articles numbering in the 80's, a few will illustrate my point.

Betts stated in 1934 that 90% of severe reading disability cases manifest faulty binocular coordination and astigmatism. Swanson and Tiffin deny completely this result. Witty and Kopel after testing 2,000 pupils concluded that poor readers were not characterized by a higher incidence of visual defects and anomolies. Eames again reverses the argument by a series of studies and places muscular imbalance at the head of the list. Selzer, in one of the prize mistakes of the literature of the field, concludes that: "Conditions of muscle imbalance and alternating vision, in addition to lack of fusion .....account for such reading disability as is not accounted for by general mental disability. The lack of visual fusion is due to muscle imbalance that has existed from birth or early infancy". Such a conclusion is so obviously false when we consider the multitude of influencing factors and

the weight of clinical evidence that no further comment is needed. Farris' study contributed little of statistical importance though it indicated some general relations. Fendrick, after a most thorough study, concluded that there are no significant differences due to lateral imbalances. Clark concurs on this point. We can continue with Tinker, Mills, Crider, Peckham, etc., but we return to the following conclusions from this measurement method, this item analysis, this consideration of parts:

1. No single factor or group of factors, either central or peripheral, can be isolated as the primary cause of reading success or disability. Reading is a whole process.

2. The measurement method has yielded controversial evidence on the importance of certain visual factors but the gross errors are generally regarded as contributing to retardation.

3. Refractive and coordinative deviations may retard or inhibit the full development of reading ability in individual cases, though not shown in group statistics. And, finally,

4. Correction of visual errors may lead to improvement in reading ability of both "good" and "poor" readers.

This series of studies tended to place visual surveys, etc., in disrepute and the optometrists on the spot. From our knowledge of visual functioning we reasoned that errors must have some influence. How then, were we going to prove it experimentally?

The answer, so far as I can see at present, is contained in the work at the University of Nebraska in which I was fortunate to participate. Certain functional tests were employed besides, and (this is important) all tests were regarded in their relation to the total functioning of the visual mechanism. No tests were isolated for special consideration.

Each test is regarded as a performance under certain conditions that limit the action of the visual mechanism and are studied with respect to this total functioning. Information from any one test is not directly transferable to the action of the whole and all test information must be integrated to understand how this individual's eyes work.

The experiment at Nebraska was carried out with all possible controls. It was comprised of two distinct experiments; the students were divided into eight groups; approximately three hundred subjects were tested; reading tests, intelligence tests, and personality adjustment tests were used. Photographic records of the eye movements were made and extensive visual examinations were made. I won't spend the time on an accurate description of the procedure used with each group, as it is complicated, over-lapping, and would only result in confusion. Sufficient to say that reading training, visual training, and even the tests used, were subjected to rigid control. Here is a list of the tests used:

Admin. lx a. Ohio State University Psychological Tests.

Admin. 3x b. Chapman-Cook Speed of Reading Test
c. The General Reading Test by S. L. Pressey(comprehension)
d. The Iowa Silent Reading Tests, Adv. Form (several techniques- speed and comprehension)

Admin. 1x e. Minnesota Scale for the Survey of Opinions. (personality adjustment)

Admin. 2xf .Ophthalmograph Reading Cards -A.O. per week

Admin. 2-
3x g. Optometric examination.

The optometric examination included the following items:

1. Brief history
2. Visual acuity with Rx and no Rx O.U., O.D. and O.S.
3. Interpupillary distance.
4. Internal and external examination for pathology.
5. Ophthalmometer.
6. Static retinoscopy.
7. Dynamic retinoscopy (40 cm.)
8. Subjective refraction and V. A.
9. Lateral and vertical phorias.
10. Lateral and vertical ductions.
11. Monocular cross cylinder.
12. Positive and negative relative accommodation.
13. Accommodative convergence and gradient.
14. Positive and negative relative convergence.
15. Positive and negative fusional reserve.
16. Amplitude of accommodation.
17. Measure of existence and degree of suppression.
18. Accuracy of changes in fixation (fixability)
19. Zone of perception monocularly and binocularly.

20. Degree of stereopsis

21. Size, shape and relation of color fields.

The instruments used in the training routine were:

1. Binocular Synchronizer .

2. The arneson Squint Korrector.

3. The Helmholtz Stereoscope

These instruments were used under the direction of Dr. George Parkins. The exact routine may be obtained by writing to him at Ord, Nebraska.

The following is a summary and the conclusions from this study:

The purpose of this investigation is to study the relation between visual factors and reading by the Orthoptic Method. This method is devoted entirely to the development of an efficient visual mechanism by the reduction of certain psycho-physiological limitations in the binocular organism of visual sensation and the broadening of certain functions which are connected with the act of reading. The considerations are:

1. The relation between orthoptic training and changes in reading ability. Reading ability and changes in it are measured by standardized optometric techniques.

2. The relation between orthoptic training and changes in visual functions. Visual functions and changes in them are measured by standard optometric techniques.

The plan of investigation is as follows:

This investigation is an experiment with college freshmen as subjects. The study was divided into two parts, referred to as Experiment A and Experiment B. The former was conducted during the first semester 1938-39 with a large group of students who made low scores on the standardized psychological and reading tests used in this study. These students were drawn from the course Education 30 (Introduction to Teaching) required of all freshmen entering the Teachers College of the University of Nebraska. In Experiment A the students selected were divided into three groups, A, B, and C, on the basis of pairings on reading and psychological tests. Group A was given orthoptic training for a period of six weeks in three half-hour sessions per week and then was given pedagogical training in one two-hour period per week for three weeks. Group B was given pedagogical training for six weeks and then orthoptic training for three weeks in training periods similar to Group A. Both of these groups, A and B, were photographed each week with the ophthalmograph (eye-movement camera). Group C was given pedagocial training during the entire semester and had eye movement film records taken only at the beginning of the experiment, again in the middle, and at the end. A visual

examination was given to students in these three groups, and Group A was given a second one so that the students in this group were tested before and after the orthoptic training was administered. The orthoptic training consisted of exercises on the Binocular Synchronizer and the Squint Korrector for each indiviudal during each training session. The pedagogical training consisted in motivated reading and development of techniques of reading.

In Experiment B, the subjects were a random sample of freshmen students registered in Education 30 during the second semester of 1938-39. The students selected were divided into three groups, E, F and G, on the basis of the kind of orthoptic training received. Three different instruments were used: Each group receiving training on only two, one alone for five weeks, then another for five weeks. Various combinations of instruments were used with the different groups. All the students in these three groups were photographed with the eye-movement camera each week during the training. Reading and visual examinations were administered at the beginning, middle, and end of the experiment to those students in Groups E, F and G, while the remainder of the students in the course were given the reading and visual tests at the beginning and end of the semester only. Another group of students received the reading tests but no reading training of any kind was administered. This group was drawn from a sophomore and junior course in experimental psychology at the University of Nebraska, Psychology 90. These students are to serve as an absolute control group since the two forms of the standardized reading tests were administered seven weeks apart and no training whatsoever was given.

The Conclusions in Relation to Reading Ability

From a careful consideration of the changes in reading ability manifested by the groups investigated and the typical cases examined, the following appear significant:

1. Orthoptic training, not supplemented by formal pedagogical training in reading, is accompanied by gains in both rate and comprehension in reading as measured by the test instruments employed in this study. The gains made by the orthoptically-trained group appear to be approximately equal to or greater than those accompanying pedagogical training alone. There is evidence to indicate that both types of training result in significant improvement.

2. Gains in reading ability accompanying orthoptic training are found not only with selected poor readers but also with a random selection of subjects. In the latter case, the gains are more noticeable.

3. The order of training, where both pedagogical and orthoptic procedures are used during a training program, is apparently of little consequence.

4. There appears to be a trend indicating that the Binocular Synchronizer is more efficient in affecting the reading ability of subjects studied than the Squint Korrector, though statistical significance cannot be attached to this conclusion.

5. Orthoptic training seems to be accompanied by greater changes in reading ability with those students whose scholastic aptitude is superior to their initial reading ability as measured in this experiment and who manifest certain functional limitations in the visual mechanism.

6. Orthoptic training seems to be accompanied by the least change in reading ability with those whose scholastic aptitude is lower than their reading ability and who manifest only slight visual limitations.

7. Subjects of high scholastic aptitude appear to make greater improvement in reading ability than subjects of low scholastic aptitude.

8. Motivation appears to be a significant factor in reading changes accompanying orthoptic training.

9. Visual deficiencies of the nature considered in this investigation appear to act as limiting factors in the development of reading ability in a significant number of cases. Large individual differences in the extent to which any visual limitation may act as a reading limitation are manifest.

The Conclusions in Relation to Visual Functions

From a careful consideration of the changes in visual functions manifested by the groups investigated and the individuals examined, the following appear significant:

1. Orthoptic training is accompanied by significant visual changes that tend toward the criteria of normality set-up.

2. The changes show a consistent trend toward the broadening of visual functions and reducing of visual limitations manifested at the start of the experiment.

3. The dispersion within the group was significantly reduced on nearly all visual measures, indicating that the group became more homogeneous.

4. There is relatively no change in the visual functions accompanying pedagogical training alone.

5. Certain functions show the influence of specific instrument training. The positive and negative fusional reserves, fixations, and the zone of recognition appears to be influenced more by the Binocular Synchronizer than by the Squint Korrector. There also appears to be a slight trend to indicate that suppressions are more quickly and completely reduced by stereoscopic training, but this trend is rather obscure,

6. Subjects of high scholastic aptitude appear to make more progress in the reduction of visual limitations by orthoptic training than do those subjects of low scholastic aptitude.

7. Motivation appears to be a significant factor in the successful elimination of limitations and broadening of visual functions by the orthoptic method.

Thus we see that the reading ability was greatly increased and the visual integration was achieved by orthoptic training. This training expanded the functioning of the visual mechanism and allowed more complete functioning of the central or brain processes. That is, it eliminated or reduced any limitation in the reading act that might be due to faulty visual functioning.

But these group changes and generalized conclusions cover up the startling changes made by some of the students. Group analysis, at best, shows only what happens to the majority of subjects. But in actual clinical work we must consider the individual, and these individual subjects become of paramount importance.

Let us then consider several of these persons in order to see what happens to the visual and reading abilities in specific cases.

CASE A: Large Change in Reading and Visual Functions

Case A is a young man student of about average scholastic aptitude for college students but of initial low ability in reading rate as measured by the tests used. The mechanics of eye movements are below normal as indicated by the number of fixations and regressions per line on the opthalmograph. This student also possesses certain visual limitations as evidenced by the optometric examination. The subject is hypermetropic to a moderate degree, and certain of the muscular functions show restrictions in relation to the "normal findings". It was also observed that there is a partial suppression in the left eye probably associated with the hypermetropia, the muscular imbalance, or both. The change of fixation of the eyes is also very slow. The subject is wearing a correction that appears to be adequate.

The student is shown to be well-adjusted socially as compared to other college students on the Minnesota Survey of Opinions test. He was given orthoptic training on the Binocular Synchronizer and Squint Korrector as outlined in the procedure for Experiment A for a period of six weeks. The accompanying changes in reading ability as measured by weekly ophthalmographic records and the standardized paper-and-pencil reading tests show marked increases in all functions measured. The rate of reading was increased from 167 words per minute to 600 words per minute on the ophthalmograph and from a score of 10 to 16 on the Chapman-Cook Speed of Reading Test, while the Pressey General Reading test also showed improvement. The accommodative convergence, ductions, and reserves show a change toward the normal with a broadening and balancing of function. The suppression was eliminated, the fixation ability became normal, and the zone of recognition was broadened.

After the four-weeks' pedagogical training in comprehension skills the rate was reduced a small amount, which is to be expected when the attention of the subject is directed toward comprehension.

This subject showed particular attentiveness, regular attendance, and was interested in the work. Motivation was probably high throughout the experiment.

This student is an example of a significant number of subjects whose scholastic aptitude exceeds their reading ability at the beginning of the training. It is probable that both orthoptic and pedagogical training are more effective on this group. On the basis of this and other similar cases where the scholastic aptitude is higher than the initial reading ability, it appears that other factors act as limitations on the reading ability. In this case and a significant number of similar ones, the limiting factors were of a visual nature; when these were removed, the reading ability greatly improved.

CASE B: Large Change in Reading with Little Change in Visual Functions

Case B is a young woman student moderately below average in scholastic aptitude as compaed to other college students. Her initial reading ability, as measured by tests employed in this study, shows her to be only slightly below average in rate and comprehension. There are only very slight visual limitations as shown in the data on the case. The only visual functions that do not approach the "normal findings" are adduction and positive fusional reserve which may be considered low. The student has a greater feeling of inferiority than the average college student, but with all is reasonably well-adjusted to college life.

This case was taken from Group A of Experiment A and was given orthoptic training on the Binocular Synchronizer and Squint Korrector, as previously outlined, for a period of six weeks. The accompanying changes in reading ability, as measured by weekly ophthalmograph records and standardized paper-and-pencil-tests, show marked increase in all aspects measured. The rate of reading increased from 254 words per minute to 660 words per minute; the number of fixations was reduced from 9.8 to 4.0 per line on the ophthalmograph. Increase in rate and comprehension is also noticed on the Chapman-Cook Speed of Reading test and Pressey General Reading test. Only slight changes are noticed in the visual functions. The zone of recognition, fixation ability, suppression, and other factors remain identical with the first testing.

After four weeks of pedagocial training in comprehension skills the rate of reading was reduced a slight amount, as to be expected when the subject's attention is directed toward comprehension.

This subject appeared to be highly motivated throughout the experiment. Her interest was keen and her attendance regular. It seems reasonable to suppose that her feeling of inferiority spurred her on to greater effort. This student is an example of a small number of students who made significant gains in reading without noticeable changes in the visual functions. On the basis of this and other similar cases, it appears probable that deficiencies in previous training account for the initial retarded reading ability. It is possible that other functions not measured may be the active ones causing this reading achievement.

CASE C: Little Change in Reading with Large Change in Visual Functions

Case C is a study of a young woman student taken from the second semester experiment, Group B. Her scholastic aptitude, as measured by the Ohio Psychological test, is in the lower quartile for college freshmen. Her initial reading ability measured by the tests employed in this study shows her to be slightly below average in most regards. Certain visual limitations in muscular balances are evidenced by the phoria and accommodative convergence. A partial suppression in the left eye and limited fixation ability are also present.

This student was given training on the Squint Korrector for five weeks and on the Stereoscope for five weeks as was prescribed for Group E, Experiment B. It will be noticed on the following pages that very little reading changes are evidenced, though slight gains are manifested on most tests. The visual functions, however, showed marked change toward the "normal findings". The accommodative amplitude, zone of perception, and steresopsis were increased, the suppression eliminated, muscular imbalances reduced, and fixation ability became normal. This student apparently was not as well adjusted toward her family as are other college students, but her general adjustment to college life was only very slightly below average for college students, as measured by the Minnesota Survey of Opinions test. This student evidenced mild interest and, though motivation was not high, it was slightly better-than-average in the opinion of the investigator.

In this and similar cases where the scholastic aptitude of the individual is equal to or below the reading achievement, reduction of visual limitations does not appear to greatly affect the reading ability. However, it is observed that the visual efficiency is improved; therefore reading has been made more comfortable and more efficient for these individuals.

CASE D: Little Change in Reading and Visual Functions

Case D is a young woman who appears to have relatively low confidence in the future, and her ability to cope with it. Though she does not feel any more inferior than the average college student, she does not appear to take a zestful part in life. Other than this, she is rather well adjusted socially as measured by the Minnesota Survey of Opinions test. She is in the lowest quartile in scholastic aptitude for college freshmen. Her initial reading ability is about average in most respects and slightly higher in rate as measured by the test employed. The fixation ability is not normal, as might be expected from the fact that 4 prism diopters of esophoria exist. There is a small degree of hypermetropia and astigmatism present, but the other functions measured show no apparent limitations. This subject, from Group G, Experiment B, was given training on the Binocular Synchronizer for five weeks, as outlined, and then on the stereoscope for five weeks. Aside from the initial drop followed by an increase in rate to a slightly faster level, very little change in reading ability is to be noticed from

the weekly ophthalmograph records. The Chapman-Cook Speed of Reading and the Iowa Silent Reading tests show no apparent changes in the functions measured by them. The Pressey General Reading test shows a drop, but it is to be remembered that previously cited data indicated that Form B is more difficult than Form A. There are practically no visual changes of any significance. The degree of stereopsis was increased from 90 to 100 per cent, but the other functions remained essentially the same.

This student participated in this experiment with the attitude of grudging acceptance of the job to be done. Motivation was rather low at all times and attendance was irregular.

It may be concluded from this and the few similar cases that where scholastic aptitude is lower than the initial reading ability, where motivation is low, and where there are few visual limitations, changes in reading ability or visual functions are very slight.

Where does such a program as this fit into the present school program? To this I can give no answer at the present time. Many of the optometrists in this state are now prepared to aid in visual surveys and in a visual efficiency program. They have been working to understand some of your problems, the problems of the retarded child, etc. At the same time, there is a growing movement to train teachers for some of this work, especially in connection to the use of the stereoscope. The interest is most heartening, but the danger is great. Much more work must be done, so much more that I have no time now to sketch it even briefly. But we have made a start, we have got the interest, we have an experimental foundation, and if we proceed with caution we will have a might powerful weapon with which to combat reading disability -- visual efficiency.

AN OCULAR POLICY FOR PUBLIC SCHOOLS

Proposed by

The Ophthalmological Section of the Los Angeles County Medical Association, Alfred R. Robbins, M. D., Los Angeles County

The examination of children's eyes in the public schools and the subsequent care of those found to have any disease or practical visual deficiency is of importance to the ophthalmologist, for it is to him that the school physicians turn for advice and scientific appraisal of this commendable and necessary service. There should be close cooperation between the school medical authorities and physicians especially trained to take care of eyes. The school authorities recognize that the ophthalmologist is best suited for leadership in this capacity, and he should continue to merit this trust and be ready to give advice when requested.

There is much controversy in regard to the eye problems of school children. Superficially contradictory suggestions have handicapped the school medical authorities in handling these problems, because equally authoritative oculists may treat a particular difficulty on apparently opposed principles. This apparent lack of unanimity in responsible medical opinion has inadvertently influenced or forced school physicians to give heed to those whose opinions and proposals are unified, often by commercial interests, and often by inadequate understanding of the complexities of the situation.

Fully aware of the difficulties which confront the school physicians in formulating a truly scientific ocular policy from many controversial suggestions, the Section of Ophthalmology of the Los Angeles County Medical Association appointed a committee to make a report to the section which would stimulate discussion and thought amongst the members in search of a representative plan for real assistance to the school medical authorities. After the first meeting of the committee the members felt that the committee should be a voluntary one in which any interested member of the section might participate, the appointed members being simply the nucleus around which the ideas might be correlated. The following is a report on the most scientific and practical method of handling visual problems in the schools. It is the result of the original study by the committee and the subsequent criticisms by the members of the section and the guest speakers at the Los Angeles Research Study Club 1940 Mid-Winter Course.

<u>The appointed committee</u>:

William A. Boyce, M.D.
Kenneth Brandenburg, M. D.
William Endres, M.D.
John P. Lordan, M.D.
Carroll Weeks, M.D.
Harold Whalman, M.D.
Clinton Wilson, M.D.
Rodman Irvine, M.D. Chairman

<u>The assisting committee</u>:

Samuel Abraham, M.D.
Carl Fisher, M.D.
Lloyd Mills, M.D.
Alfred Robbins, M.D.

The assisting committee (continued)

Eugene Lewis, M.D.

Francis Rogers, M.D.
Harry Smith, M.D.

The advisory committee:

Edward Jackson, M. D.
Albert D. Ruedemann, M.D.
A. B. Reese, M. D.

Meyer Wiener, M.D.
W. M. Gardner (School Board)
C. Morley Sellery, M.D. (School Board)

Reviewing the literature, the committee was greatly aided by the studies of investigators in other sections of the country. The problems involved in the examination of the eyes of school children are undergoing study in many educational centers. The 1939 November and December issues of the Archives of Ophthalmology and The American Journal of Ophthalmology alone show six articles having a bearing on the examination of the eyes of school children.

REPORT

From the point of view of the school the problem may be divided into four principal headings: first, methods of examination, sensitive enough to detect eye conditions that handicap the child in school work, yet of such a nature as to be done quickly and accurately under conditions of mass testing; second, preventive or "sight conservation" measures; third, reading problems; and fourth, care of those patients unable to pay a private physician.

Needless to say, the public school system has a definite public health responsibility in the early recognition of diseases of the eyes. Contagious diseases of the eyes should be recognized in the beginning stages, so that proper precautions can be taken to prevent their spread to other children. Other diseases should be discovered early, so that the child may be referred to the proper persons for treatment. It is beyond contradiction that the only person fully qualified to diagnose and treat diseases of the eyes is a Doctor of Medicine adequately trained in this specialty.

Fundamental Considerations

Before discussing methods of examination, it is necessary to consider the degree of abnormality that would interfere with school work. One is then less likely to use methods that are too refined and therefore not practical.

Certain fundamentals regarding the structure of the eye and its growth should be considered. The first is that the average human eye is not an optically perfect structure in a mathematical or physical sense, but that it is a physiologically effective and durable organ with a wide range of adaptability. A second consideration pertains to the development of

the eye and especially its optical perfection or imperfection from birth to maturity. The third consideration is that the eyes of the young have great power of accommodation and adaptability, and generally, optical imperfections are less noticeable to the young than to the mature individual.

Growth

The infant's eye is normally farsighted or too short for optical perfection. As the child's head and eyes grow, farsightedness usually decreases. Decrease of farsightedness during infancy, childhood, and adolescence may be such as to approach optical perfection; or it may go on to nearsightedness, a condition in which the eyeball is too long for optical perfection.

The end result at maturity, according to available evidence, is primarily determined by heredity. There is not at present any scientifically proven way of altering shape, growth or eventual optical state of an eye. For example, definite diet, exercise, or conditions of use of the eyes cannot be conducted in any known scientific way that will alter the optical state. The only known way of correcting or overcoming these optical errors is by means of glasses to redirect the rays of light entering the eye. This does not mean that every discoverable optical imperfection demands correction by glasses, especially if the person sees well, is not cross-eyed, and is normally efficient and comfortable.

Refractive Errors

Farsightedness up to three diopters in a child 5 to 9 years of age and two diopters in a child 10 to 16, may be considered normal, and usually needs no correction. However, any degree of farsightedness associated with squint or diminished visual acuity warrants correction. If symptoms occur with low degree of farsightedness, causes other than this eye condition should be carefully sought.

Nearsightedness, even of small degrees, cannot be adequately compensated for by the focussing apparatus and is a distinct handicap to the individual's distant vision. His near vision, however, with low degrees of myopia, may be enhanced since the accommodative effort is less and the image magnified. This inability to see at a distance and ability to see well at close range probably influence the child's preference toward activities in which he has the advantage. An impression is prevalent that close work is a causal factor in myopia, but it is not yet clear whether it be cause of effect. However, the consensus of opinion, although without scientific basis, is that nearsighted persons should be restricted in their amount of near work and their attention value for distance increased by wearing a fully corrective glass.

The problem of myopia or nearsightedness and malignant progressive myopia in particular, is not entirely a matter of glasses. Clinically there is reason to believe that improper nutrition and states of lowered physical health induced by diseased conditions elsewhere in the body may

influence the development and progression of some cases of myopia.

It should be here noted that there are cases of pseudo-myopia induced by too much close work. In the child the ciliary muscle, that muscle within the eyeball which focusses the eye clearly for close work is very active. It sometimes develops a sort of cramp or spasm which cannot be relaxed voluntarily. Such cases are easily found out when a drug is used which relaxes this muscle, making possible measurement of the true refractive state uninfluenced by the focussing apparatus. The treatment is obvious, and it is also obvious that in such cases the giving of glasses for pseudo-nearsightedness is just the wrong thing. Despite much propaganda to the contrary, there is no evidence that the use of such drugs under proper control and indications is injurious.

Astigmatism is normally present to some degree in from 85 to 90% of eyes. It is a condition much worried about by the layman, and so is often exploited to his disadvantage. Astigmatism simply refers to an asymmetrical curvature of the refracting surfaces of the eye and does not require glasses for correction in all cases. Astigmatism should be corrected with glasses when it is sufficiently marked to impair acuity of vision or produce symptoms definitely referable to the eyes.

The objection has been raised that a child's eye is unable to accommodate for astigmatism as the focussing muscle does not contract unequally in different meridians, and therefore any amount of astigmatism should be corrected. In answer to this objection one can easily show that the eye does compensate for astigmatism by automatically picking out the circle of least confusion (the point of maximum visual acuity midway between the focussing points of the two different meridians). This circle is almost a point, with degrees of astigmatism up to .75 D and even with higher errors, as can be demonstrated readily by comparing the visual acuity with perfect astigmatic correction with the visual acuity with the spherical equivalent. This comparison can be made with a child as well as an adult. Obviously it does not matter whether the astigmatism is of farsighted or nearsighted type, as all signs become positive in near fixation except myopic astigmatism of -2.00 D. or more, which, as previously stated, requires correction.

Lowered physical health and improper nutrition frequently make it more difficult for the child to overcome optical errors which are minor in themselves. Such cases may need glasses temporarily, and the qualified eye physician would recognize such conditions and take steps for their correction.

Finally, it should be noted that the wearing of glasses which increase visual acuity does not affect the growth or shape of the eye and is not a preventive measure against development of pathology. A possible exception to this statement might be made in certain cases of nearsightedness.

Muscles

Regarding the nature of the extraocular muscles, evidence at

present indicates that they are a primitive neuromuscular mechanism less highly integrated than skeletal muscles and resembling more closely purely tone muscles. The evidence is based on histological studies, physiological response to certain drugs as acetylcholine, and neurological studies failing to demonstrate position sense. The important afferent impulses are determing their delicate response.

According to Lancaster and Howe these muscles are individually able to pull sufficiently strongly to lift a thousand gram weight. The eyeball weighs approximately seven grams. When the eyeball moves, the muscles normally do not pull against each other, for the antagonist is relaxed by reciprocal innervation. Consequently, even assuming faulty reciprocal innervation, the reserve strength of an eye muscle is 50 to 100 times that used in ordinary movements. This reserve presumably makes it possible for fewer fibres to act at one time, allowing the remainder to be at rest, an arrangement which diminishes fatigue to a minimum. Assuming that these muscles have the characteristics of other tone muscles, and the evidence for this assumption is better than that they are like peripheral muscles, their metabolism is low, and the blood circulation sufficient to prevent accumulation of metabolites even with extreme use, so that there is nothing like the fatigue which occurs in a skeletal muscle. Likewise, the ciliary muscle resembles a tone muscle.

These facts indicate that ocular fatigue is not related to a peripheral mechanism but rather to a central one dependent on effort, attention, and concentration. Also, that any series of exercises or orthoptic training that undertakes to alter the position of eyes or the strength and function of the extraocular muscles, if beneficial, probably succeeds not by virtue of effects on the extraocular muscles, but rather by effects on the central mechanism of vision, such as fusion and stereopsis, which are primarily brain and not muscle functions.

Proposed Methods of Examination

The school's object in ocular examinations is to determine abnormalities that actually interfere with the child's learning processes. From what has been said above, optical imperfections or muscle imbalance great enough to handicap the student are rather gross and readily apparent in most instances. Obviously, the most important single test is of the visual acuity. The method used to determine this should simulate as closely as possible conditions under which eyes are used normally: i.e., visibility of the blackboard and of fine print at close range. The principle of the Snellen chart, using illiterate figures which are difficult to memorize, seems to answer best the requirement for blackboard vision. Similar cards printed to scale can be used for determination of near vision. In most instances of mass testing when distant vision is normal, the school must assume normal close vision. Visual acuity of less than 20/20 in children over 10, and less than 20/30 in younger children, and amplitude of accomodation less than 5 diopters in the older group, should be sufficient evidence for referring the child for ocular examination. More than average difficulty in reading is indication for ocular examination regardless of the distant vision.

Muscle imbalance does not handicap nearly as much as diminished

visual acuity. However, its presence to a degree that may handicap the child either socially or scholastically is so easily discernible that examination for it should be included in the school routine. The easiest and most reliable method and one which examines the eyes under the usual conditions of use is the cover test. Uncompensated muscle imbalances (deviation of the eyes from parallelism) of 5 degrees or more is obvious to inspection. Less than this can be readily discerned by covering one eye to see if the other eye moves to fix. A distant fixation object and a near fixation object should be used. If there is no movement the non-covered eye was fixing before the other was covered. The cover test should be made on each eye. Compensated muscle imbalance (tendency for the eyes to deviate from parallelism) can be determined in a similar way; but in this test, the eye under cover is the one that moves. The best observation is to note whether or not the eye covered has to move back to fixation position when the cover is removed. A jump of the eyes of about one-half the width of the pupil or more indicates imbalance, which may or may not be important, and may be caused by a latent refractive error, and warrants reference for further examination. Convergence can be simply and readily tested by asking the child to look at some interesting object held close to the eyes and observing whether both eyes turn in to fix the object. If convergence is impaired it may or may not be significant but indicates that further examination is desirable.

According to Verhoeff practically everyone who is able to fix binocularly has stereopsis. For this reason special tests for stereoscopic vision are not indicated. Lack of stereopsis certainly is not a handicap as far as reading is concerned. As a matter of fact monocular reading produces less stress and may take less effort than binocular reading because with one eye in use at a time there is no effort expended in maintaining muscle balance in fusion. It should be pointed out here that high degrees of muscle imbalance, especially the vertical type, presumably increase effort for seeing. Unfortunately these vertical deviations do not respond satisfactorily to fusion exercises, as with a stereoscope. Horizontal imbalances respond more satisfactorily. However, these much discussed exercises only alter the relative position of rest of the eyes after extreme application, if at all, and in most instances any increase in amplitude of fusion gained by exercises is lost soon after the exercises are discontinued. Generally muscle imbalances are best treated by incorporating prisms in the glasses worn, or by surgery.

From the above considerations based on a critical review of the literature it is obvious that complicated pieces of apparatus for the examination of eyes in the schools are unnecessary. In fact, in the school system as constituted they do more harm than good, for they give a false sense of accuracy and completeness and require specially trained operators. Furthermore, the results are difficult to interpret, as the eyes are observed under abnormal circumstances of use. The presence of these instruments lends a pseudo-scientific air to the examination, and there is no justification for them in school equipment.

We can find no scientific reports to support the use of the now-popular Betts Method for screening out eye disorders requiring reference

to the eye physician. It is unfortunate that the Betts cards are presumably made for the only in the telebinocular stereoscopes. This reputed peculiarity prevents their use in the ordinary stereoscope and undoubtedly is a commercial trick to increase the sales of the telebinocular, which now costs 15 to 20 times as much as an ordinary stereoscope.

Sometime early in the school career tests for color vision should be made, Holmgren's yarn test for younger and Ishihara charts for older children; not that anything can be done about it, but in order that the teacher may appreciate the child's deficiency and the child be better advised in choosing a vocation.

Sight Conservation Measures

"Conservation of the Eyes and Vision" implies that the eyes can in some way be injured unless certain precautions are taken. It is very difficult experimentally to set up anything like normal conditions that can be shown to injure the eyes in any way. There is no structural or pathological condition known to result from "misuse" of the eyes. Sound evidence is lacking that poor lighting conditions, concentrated close work, failure to wear glasses or even wearing the wrong glasses, produce refractive errors, injure the focussing apparatus, or damage the retina or optic nerve; and statements to the contrary are not confirmed by controlled evidence. Nevertheless the general feeling is that such conditions are to be eliminated, particularly for the nearsighted, as previously mentioned.

That proper conditions for seeing facilitate accomplishment of any task requiring use of the eyes is ample justification for improving vision in any way possible, whether by glasses, lighting, periods of relaxation, improved print, etc., or by having the student's desk a better height so that he doesn't tire from cramped position. "Conservation of sight" claimed for some commercially recommended equipment should, in the interests of public health, be changed to "Conveniences for seeing". The problem of conservation is really one of lessening effort to see, since there is no way to conserve the eyes that we know of, and no more need of it than there is for conserving the other sense organs of hearing, smelling, or touch. Such extraordinary circumstances as produce eclipse blindness, radiation burns, boiler maker's deafness, etc., are of course too extreme to be considered with conditions ordinarily experienced.

Reading Difficulties

It is obvious that if the visual acuity is reduced 50% or more, the child will have difficulty interpreting symbols because he cannot see well, just as the deaf child will have difficulty with pronunciation. However, the effect of moderate refractive errors has been grossly exaggerated. Except in farsightedness and astigmatism of a marked degree, the child's power of focussing is sufficient to give adequate though not perfect vision, and a small amount of myopia may even be an advantage rather than a disadvantage in reading. The presence of a crossed eye with normal vision in

one eye has little or no effect on reading ability since vision in one eye is adequate for reading, and under such circumstances the image in the nonfixing eye is suppressed so that there is no confusion or "incoordination". Stereoscopic vision is normal and desirable, but has no special value when one is looking at a flat surface; and the lack of it, if there is no other variation from average, has no bearing on difficulty in reading. Compensated muscle imbalance, as phorias of a marked degree, do not affect interpretation of symbols, but effort expended to see binocularly can be said to discourage reading. Phorias of such magnitude are readily picked up in the examination outlined above, and should be corrected by lenses, prisms, or by surgery. Fusional exercises for these cases, as suggested above, are impractical because of the time needed to accomplish results which are generally shortlived. Given a pair of eyes with average vision, reading difficulty cannot be considered an eye problem but rather a problem for the educational psychologist. Eye difficulties responsible for poor reading are easily identified as such and are not very common. There is no reason why the eye should not be taught to recognize symbols as early as the ear is learning to recognize sounds. The average child with proper attention could start to recognize words between three and four years of age. From the point of view of physiology of the eye, there is no evidence that such use of the eyes at an early age is detrimental. Not the eyes but the brain learns to read. This is an important consideration when we consider the visual span of recognition. This is a mental and not a retinal function.

The area for sharp vision is only a tiny area in each eye. Its size is determined anatomically and is fixed and permanent. Training does not increase the size of this area. One's ability to see more at a glance can be increased by concentration and practice whereby one learns to get cues faster and needs fewer of them to understand a phrase. Rapid reading is a matter of thinking rapidly with attention to significant cues in groups of words which have become familiar through practice.

The process of learning to read undoubtedly varies with the individual. Some nervous systems are more impressionable to visual stimuli than to auditory, kinaesthetic, or touch stimuli. Others are more impressionable to kinaesthetic stimuli. We know there are certain individuals, usually boys, whose recognition of word symbols by means of visual stimuli is subnormal, but who recognize, remember, and associate the same word symbols readily through practise tracing the word with the finger, thereby stimulating kinaesthetic and touch sensation. It would seem that any system of teaching reading that does not make use of all avenues of afferent approach will fail with certain groups, whereas use of avenues of approach other than the one to which the child responds most readily does not retard the process of reading as long as a combination of methods is used. In fact, the more associations built up, the more rapid the learning process. This concept implies that the "flash" method of teaching reading, used without combination with other methods is inadequate. Instruments devised to teach the flash method would therefore be suited for use only with children primarily of the visual type. In their place much simpler and less expensive devices, as simply covering all but certain groups of

words with a piece of cardboard, could be substituted. For a child who can already read, these instruments are of no use in increasing speed of reading other than to focus one's attention on the problem, since rapid reading does not depend on rhythmic movements but varies with the subject matter and comprehension, conditions which cannot be duplicated mechanically.

There is no criticism implied of the present method of teaching reading nor of the teachers themselves. We feel that pupil-load per teacher, particularly in the first grades, should be reduced as rapidly as the budget permits, so that more attention can be given to children who do not learn to read readily. It would seem that available funds could be used more profitably in that direction than by installing new untried methods whose effectiveness is open to question.

It might be of interest to mention the recording of eye movements as diagnostic of reading difficulty. As would be expected from what has been said, results of research in this field have been entirely negative. In the first place, there is wide variation in eye movements among good readers according to subject matter read; the number of regressions or backward movements has zero correlation with speed of comprehension. In the second place, the evidence indicates that eye movements are desultory because the subject cannot read, and not that the subject cannot read because eye movements are wandering. Measuring of eye movements seems to be so much wasted time and outside of the sphere of the public schools.

Care of Patients Unable to Pay a Private Physician

The running of school clinics to take care of children found deficient on eye examination and unable to pay for private medical care can be simplified over that now existent. Facilities staffed and administered by responsible men and women exist in the community. Proper utilization and cooperation of these existing facilities should be extended to the utmost before resorting to a system of school eye clinics. The recommendations in this report should give scientific approval to dispensing with many procedures now practiced in the school clinics, as use of the Metronoscope, Ophthalmograph, and Telebinocular. We have explained how relatively simple procedures are actually more sciantific and informative than complicated procedures requiring more time for the examination and special apparatus.

Orthoptic training for correction of cross-eyes and muscle imbalances is not advisable or practical in school clinics, since the subject of teaching stereoscopic vision to such pupils is far more complicated than is generally appreciated by the average person doing orthoptic training. It is generally agreed, however, that to gain any results, reflex paths must be changed, and the time and practice and constant attention required to accomplish this is utterly impossible in a school clinic. Until more research is done in this field, unsupervised corrective work other than occluding for amblyopia belongs outside the school at this time.

SUMMARY

School authorities are handicapped in deciding proper ocular procedures by conflicting ophthalmological suggestions. Unqualified groups motivated by selfish interests exert an influence far from scientific. This paper endeavors to show a scientific manner in which this problem should be treated. In addition to the method, it emphasizes the following points that generally are not known by the school physician and that have been partially used as an excuse for the so-called "progressive" plan of education.

1. There is no physiological reason why the eyes should not be taught to recognize visual symbols as letters, figures, or words as soon as the ear is learning to interpret auditory symbols. There is no scientific evidence that "reading readiness" or "seeing readiness" develops later than hearing readiness, yet as far as is known, no one has suggested inhibiting a child from learning to recognize and appreciate complicated sounds as music or language.

Many children learn to recognize street signs as early as three years of age. There is no harm in this curiosity and interest, and we often find it extending to reading of words on cereal boxes, etc. This interest can be encouraged easily.

2. A belief prevalent among certain school authorities is that eye muscles are not properly coordinated at an early age, unable to handle reading matter, and that cases of reading difficulty can be helped by training the extraocular muscles. Apparently this belief has arisen from two sources; first, commercial houses selling machines and equipment for exercising eye muscles; and second, experiments with these machines reported by educational psychologists showing improved reading ability.

The first source needs no comment. The second is derived from well intentioned work incorrectly evaluated. Much worth-while scientific work has been done on this problem by our major educational institutions as Harvard and Dartmouth, and it all indicates that eye muscle coordination is a function of vision and not that vision is a function of eye muscle coordination. The eye muscles have no position sense. Any muscle coordination depends on the muscle having sensation telling its position at any given time, olso the muscle would have no indication as to whether to pull hard of lightly to accomplish a task. The eye muscles depend on sight for their sense of position. This peculiarity of eye muscles, as compared with most muscles elsewhere in the body, is evidently not appreciated by many individuals working with reading problems. So-called "faulty" eye movements, as judged by regressions, depend primarily on poor visual understanding of the subject matter read and not on incoordinated eye muscles. This can readily be shown by observing the eye movements of a good reader tackling a strange pattern, as a foreign language. Results of improved reading ability from exercises with the metronoscope, ophthalmograph, telebinocular, and other machines depend primarily on the patient's attention being focussed on his reading problem and on the increased individual attention given to his reading and not by any effect on the extra-

ocular muscles. The same might be accomplished by any number of methods simply as a matter from concentration and repetition. There is no reason for having these instruments in the public schools, and the money spent on them and their operation could more wisely be spent on salaries to lessen teacher load in the primary grades.

3. The belief that school work may harm the eyes or predispose them to the need for glasses has no scientific basis. We know of no pathological eye condition arising from use of the eyes from school work or from so-called "eye strain". The problem of nearsightedness developing in students who are great readers would seem to contraindicate the above statement. However, it is not known whether the nearsightedness is a result or a cause of increased close work with the eyes. It is known that heredity is an important causal factor. Nearsightedness usually develops around the time of puberty, and consequently it would seem that delaying reading to this time with the idea of preventing nearsightedness which is known to be inherited is hardly justified. On the other hand, given a nearsighted individual, the wise procedure is to curtail reading and other effort that the eyes may make on close work on the basis that this may have a beneficial effect.

4. Regarding the process of learning to read, not the eye but the brain learns to read. Good visual acuity is certainly a primary requisite. However, it should be pointed out that memory in some individuals is more affected by auditory and kinaesthetic stimuli than by visual stimuli, and consequently in teaching reading all avenues of approach to the brain should be used. One may supplement or enhance the other. The more mental associations developed in learning a word, the more indelibly that word is impressed on the mind. This concept would indicate that the flash method of teaching reading, when used alone, would be inadequate with certain groups. These groups would do better at the beginning by the auditory or kinaesthetic approach, ultimately associating these with the visual approach until visual memory has been conditioned up to a useful level.

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GENERAL SEMANTICS AND READING

H. E. Scarbrough, Ph.D., Consulting Psychologist, Los Angeles

At the outset, if I am going to practice semantics, I will have to stick to the semantic side of this topic, since I am not thoroughly conversant with all the recent advances in the psychology of reading 1940. If, in relating what I feel to be the contribution of General Semantics to the psychology of reading, I introduce factors which have already been considered, you will have to consider that I am talking about the psychology of reading 1938 when I was last conversant with the field. I suspect that there are at least <u>some</u> fundamental factors which the psychology of reading, along with education in general, has not considered as yet. I shall try to sketch these fundamental factors and explain why I feel they are of the deepest importance for any consideration of the reading problem.

The point at which the psychology of reading and General Semantics most nearly touch is in that field of reading called "reading comprehension". In the past we have thoroughly investigated peripheral mechanical factors, and we may well be proud of the advance that has been made in the last decade in the investigation of such important neuro-visual acuity, the relationship of patho-physiological conditions in the eye to reading difficulty. These investigations have given us much valuable knowledge about what I would call peripheral factors in the reading problem. But the psychology of reading has attempted to go beyond this and has attempted to test a more elusive and higher brain-visual function called "comprehension". In testing comprehension in reading, a standard method is to give a student a reading passage, have him read that passage in a certain period of time, take the page away from him and require him to reproduce either certain important details about the material he has just read, or the central idea or ideas contained in the reading passage. With all of this General Semantics 1940 would have no quarrel. If General Semantics has anything to say at all about the reading problem, it is simply that it begins to make its contribution at the point where the field of the psychology of reading leaves off.

Consider a particular case, say a certain John Smith who has just finished reading the test reading passage, and is now being required either verbally or on certain prepared test blanks to give the central idea of what he has just read. Suppose that he gives as the central idea of the reading passage that the wet spirometer is the best machine for measuring vital capacity. As I understand the psychology of reading 1940, if this really was the central idea of the reading passage, our Johnnie Smith would be given an "A", or a pat on the back, or a dismissal from the clinic, if he had enough other responses as accurate as this one, and would be considered no further problem for the educational system. He would be considered perfectly adequate to go ahead and get the rest of his education. It is just at this point where the reading psychologist turns little Johnnie out of the clinic, that the General Semanticist begins to be interested in Johnnie. The General Semanticist, for instance, would be interested in knowing whether if Johnnie were put in a room full

of physiological apparatus, he could pick out a wet spirometer. He would be interested further in knowing if Johnnie could operate the machine, if he would know what it measured, and if he would know the significance of the measurement so obtained; the relationship, for example, of vital capacity as so measured to the circulation of blood in the human body. In other words, the semanticist would not be satisfied with Johnnie's ability to relate words to other words, to be verbally facile, to tell us that the wet spirometer is the machine for measuring vital capacity, and that vital capacity is the function measured by the wet spirometer. The semanticist would be interested in knowing if Johnnie could break out of this verbal ring and relate the symbols he is using to the external non-verbal world. In brief, science is interested in the relationship of fact to fact; logic in word-word relations; and General Semantics in word-fact relations. General Semantics investigates the process through which human nervous systems go in manufacturing symbols. It investigates the relations between these manufactured symbols and the facts they are supposed to refer to.

From a semantic standpoint, the problem of reading becomes only a particular division of the much larger problem of symbol interpretation in general. There are many ways of going at the problem of meaning or symbol interpretation, but General Semantics represents a highly scientific neuro-physiological method. General Semantics may be said to be a scientific epistemology. This defines its type of approach to the reading problem. For example, General Semantics would be interested in the particular response, the particular neuro-physiological representation in the brain and nervous system that Johnnie Smith has built up through the conditioning process to say the word "blood", for example. It would regard as "academic" or "superficial" or "verbal" the question of how blood is defined by a vocabulary test or by the dictionary, or by Mr. Terman, or "in general". It would regard a particular neuro-physiological response of Johnnie Smith at two p.m. on, say, July 16,1940, as the only valid meaning of the word "blood" in that situation. General Semantics would not deny a certain core of similarity of meaning existing between various individuals' reactions to the word "blood". But it would demand that we investigate empirically the amount of agreement and not speculate about it in dictionaries and in vocabulary tests. Many amazing consequences have followed this radical neuro-physiological approach to the problem of symbol interpretation. Two general methods of investigating word-fact agreement amongst human beings have been formulated. Johnson of Iowa in 1939 introduced for the first time, to my knowledge, mathematical measures of word-fact agreement. He measured one type of agreement which he termed the measurement of extensional meaning. He relates this experiment as follows: "Recently I instructed twenty speech pathology students to "make a tally mark each time I stutter" and "put a circle around each tally mark that represents severe stuttering." The problem was to determine the degree of agreement among the twenty students as to the extensional meaning (meaning in terms of the objective examples to which a label is to be applied) of the terms "stutter" and "severe". In this case, as will be noted, the particular objective referent, to which any given tally mark (label) was applied, was not known.

"The number of tally marks and the number of encircled tally marks made by each student were determined. The number of tally marks made by the twenty students ranged from 20 to 80; the number of encircled tally marks ranged from 1 to 19".

The value obtained for the word "stutter " was 65.4 and for the word "severe" it was 50.8. That is, the twenty persons agreed as to the extensional meaning of the term "stutter" 65.4 percent of the times they applied the term as a label. They agreed as to the extensional meaning of the term "severe" only 50.8 percent of the times.

What Johnson did here roughly and informally he carried on to formal rigorous laboratory studies which are reported in his General Semantics Monograph published by the Institute of General Semantics in 1939. The results in all of these experiments were quite similar. Agreement in relating a particular label such as "stuttering" to the non-verbal event or events it was supposed to refer to, was found to be astonishingly low. Since these experiments are so new, and since without General Semantics there is no remedy to the problem it proposes, the widespread significance of these experiments has been overlooked, or toned down. It is not a comfortable thing to think that to any great degree we human beings are disagreeing in relating labels to facts. It is much more comforting to suppose that "we know what we mean," that "everyone knows what stuttering is". From the informal and formal experiments that have been made on this method of measuring agreement, I would suspect that if these measures were taken seriously, a great deal of what is now called education, political science, sociology, psychology, history, would have to be radically revised, for the reason that we would find that to a very large degree the crucial terms employed in these fields are so highly abstract that not only would there be low agreement if the experts were asked to point to the facts their symbols relate to, but to a large extent, they might not be able to point to any facts at all. The referents for such terms as"the consumer", the "capitalist", "laissez faire", "society as an organism", I think would puzzle not only a group of college freshmen, but also Mr. Taussig, Mr. Bogardus, or Mr. Terman. It is amazing that until 1939 we were so unconscious of word-fact agreement and disagreement that we did not even bother to measure it. I propose that until the crucial terms of most of the social sciences are checked in this way, the social sciences will continue to have low predictability, disagreements, and innumerable conflicts, and to be generally sterile in their influence on social progress.

However, what we are interested in this afternoon primarily is the problem of reading, and what we are discussing now is of the utmost importance for reading. If Johnson's experiments in word-fact agreement be validated generally, a new factor has entered the reading picture which will alter the entire field of reading, because what good is it going to be to give our Johnnie Smith a high vocabulary, if he hasn't the vaguest idea what non-verbal realities these words refer to?

I cannot conceive, to be frank, how the reading field can lay any

claim to being scientific, and not recognize discoveries such as Johnson's, and if they recognize these discoveries of Johnson's, I cannot conceive how the field of the psychology of reading can remain the same as it is now. To go on, industriously teaching students to manipulate symbols without referents, to go on acting as if the old abstractions were understood by everyone long after their meaninglessness has been proven is a ritualistic a-scientific procedure.

Symbols in and of themselves have no value, no more than a bank check without sufficient funds behind it has value. Symbols have orienting value only, as they refer to non-verbal events in space-time, and as they refer to the same or quite similar events for different people. If it turns out that the structure of our present language outside of the more physical sciences, such as physics and chemistry, is of such a nature that low agreement in word-fact relating is almost a rule, what good is it to train students in the highly facile manipulation of these symbols? It is in this connection that the oft-quoted criticism of college students, that they are academic and full of booklearning and unable to adjust to the realities of the business world, begins to make sense. What is needed for human survival value is an adequate neuro-physiological orientation to non-verbal realities. Symbols are of value only as they help us to orient ourselves to these realities. It does you little good, for example, to know all about how to operate a car verbally, if you have never seen one, or ridden in one, or driven one. You might define a car as an "automobile" or as a "mechanical conveyance with four wheels and an engine" but unless you had actually some non-verbal experience with an automobile, your knowledge would be of little value.

There is another measure of word-fact agreement, and it brings equally discouraging results. It is called the measurement of intensional meaning. Here we take a word and ask a group of people to define it, using other words, and then measure the degree to which the people have used similar or identical terms in defining the word. This is something very easily tested in a classroom, and brings such amazing or discouraging results, depending on your point of view, that few people keep up the measurement very long. Here, for example, are the replies of eleven people when asked to give a definition of the term "idealism"; "fanatical", "altruistic", "not practical", "exact", "poetical", "intangible", "sentimental", "true", "what cannot be proved", "opposite of materialism", "something to do with the imaginative powers". I propose that this is not an unusual example. Try asking your classes for a definition of "personality", "adjustment", or of "inferiority". I think the sample I have given you will seem like a sample with high agreement in it compared to the ones you will get. The amazing thing about it is that the professors whom I have known to make such a survey have gone right on using the terms "personality", "adjustment", and "inferiority". They haven't seemed to grasp at all the fundamental issue at stake which we must face. The fundamental issue is that when we are producing these symbols they are calling up in our brains and nervous systems one set of images and in the brains and nervous systems of our listeners a vastly different set. Not

to face this empirical fact is to reveal a belief in the magical thinghood of words, to believe that they have some validity in and of themselves, to deny the fundamental premise of General Semantics that the word is not the object. We must face these issues in the psychology of reading. It is a trifle disconcerting to think that to a degree we are training students in the facile use of symbols which quite often have about as much extensional or objective meaning as the sentence "Bla is bla".

So much for the negative side of the matter, the differences between the psychology of reading 1940 and General Semantics, and the alleged deficiencies in the reading field. What, in a positive way, has General Semantics to offer? In the first place, General Semantics has as so much to offer that it seems almost hopeless to try to cover it in thirty minutes. As an empirical fact of training, if you are willing to spend six months in General Semantics, reading all the literature through many times, and working at the working devices, you can hope to have a fair understanding of the implications; but since we have to start somewhere, I will try to sketch here a little bit of the contribution of General Semantics.

I said in the beginning that General Semantics represents a scientific epistemology 1940. In other words, it is interested in the problem of knowing how we know and what we know from a neuro-physiological rather than from a philosophical standpoint. Korzybski in his amazing volume, "Science and Sanity", establishes what might be called a hierarchy of adequacy in the knowledge that a human nervous system and brain have about the world in which they are immersed. Wendell Johnson in his monograph represents this in a diagram which is somewhat easier for me to use as a teaching device than Korzybski's structural differential. Johnson takes an apple through what he calls the process of abstracting. Abstracting may be called the process of leaving out details. This process is fundamental in the working of the human nervous system. All human nervous systems abstract, leave out details, and this process is ignored or toned down by education 1940, and I have certainly never seen it discussed fully in a text of the psychology of reading. As you will notice, in this diagram I am showing you now, this first level is termed the "submicroscopic level". If we are regarding this apple which Johnson has chosen as an example at this level, we talk about it in words familiar to the physicist, such as "molecule", "atom", "electron", etc. This is the realm of events which cannot be seen through a microscope with the highest magnification known July 16,1940. Because of the behavior of certain other events in space-time which can be seen, inferences are made as to events involving much smaller divisions of space-time which cannot be seen. These inferences are not like the inferences of the layman which are not checked, but predictions are made on the basis of them, and are found to come true. Whole fields of industrial progress would be impossible without a concept of events at this level. Radio, for example, would not have been without electronic theory. Many significant industrial processes are dependent on

sub-atomic concepts. The main thing to remember about this level is that it is the level considering the most factors, having the finest detail, leaving the fewest events out, known to science 1940, and prediction which is the goal and the be-all and end-all of science is greatest when events are known at this level.

The next level considered on this diagram of the process of abstracting is the microscopic level. Remember we are holding the apple in our hands and looking at it at different levels of detail, or abstraction.Now we are looking at the apple through a microscope. Details can be seen which could not be seen with the unaided eye. Details are left out which are present at the submicroscopic level. Men having knowledge of this level have greater prediction than men having knowledge only of that which can be seen only by the unaided eye. The invention of the microscope gave rise to modern medical predictability. It is invaluable in aiding the physician to diagnose the type of disease and make the proper recommendation as to surgical or pharmaceutical treatment needed. The blood count has become a commonplace procedure for the acute case or hospital entrance, and through it countless lives are saved.

At this point, I must introduce another new term: identification. Identification refers to the process of acting as if two different events were the same. We can identify these levels of abstractions. We can act as if what we see through the microscope is all, and then we are ignorant and contemptuous of atomic physics, and have no use for Einstein. We can act as if what we see is all and ignore the microscopic level. The number of people who get venereal disease may be taken as one rough index of those who act as if what they see is all. The number of people who go to Mexico and become ill from drinking the water also belong to this group who do not believe in the reality of the microscopic level. A person reacting to two different wires as if they were the same, and getting a terrific shock from one because it is electrically charged, is another example of this process of ignoring the microscopic level.

The next level up on this diagram is called the "Macroscopic level". It represents the level of events as seen by the eye unaided, our apple as our eye perceives it. The invention and consistent use of the microscope, of course, has made us aware of how much detail is left out when we perceive things at this level. The science of histology, of course, would be impossible. Blood would appear as only a red, highly undifferentiated fluid, with only the coarsest differentiation possible. We are acting as if the macroscopic level is all when we say that a person looks healthy, and are shocked at their subsequent death because we have ignored the probability of microscopic and sub-microscopic lesions. In the long history of the world, events have been perceived macroscopically for a very long while, and microscopically only recently, as it were. Therefore, our language, coming to us from primitive days, reflects a macroscopic outlook on the world. The macroscopic world is stationary, fixed, slow moving, coarse, in comparison with the microscopic world, and of course the sub-microscopic world is a literal, mad dance of activity in

comparison. Our everyday language has not reflected these scientific advances and we tend to have rather fixed and static orientations to a world which science has revealed to be from one point of view hopelessly dynamic. Predictions made at this level are not as accurate, and hence not as valuable as predictions made at the microscopic and sub-microscopic levels. Men who know the facts at this level are not as accurate and do not have as high predictability as men who know the facts at lower levels of abstraction.

Now remember that we still have our apple theoretically in hand. Its position in our hand has not changed. We are simply looking at it at different levels of detail or magnification or abstraction. Now we are going to take the biggest and most dangerous jump involved in the entire process of abstraction. We are going to quit looking at the apple and burst into speech. We are going to have in our brain not a visual representation of the apple, but a representation caused by the word "apple". We are going to say, as descriptively as we can, "this apple". From here on we will have nothing in our hand -- we will point to nothing. We are now in the verbal world. A minute ago we were in the non-verbal. This first level in the verbal world Johnson has called the level of the label or descriptive statement. You will recognize that when you have made the most differentiated, specific, statement about an event, that statement still cannot neurologically convey the same representation as if the person actually saw the event. I could tell you for days of every rock formation, every waterfall, every forest in Yosemite, but if you had not been there, I could never give you the same neurological representation in your brain that you would get by standing on Glacier Point. The verbal levels at their best leave out innumerable details. In the more physical sciences we have understood the implications of this, and have said that it is not enough for students to read highly descriptive and specific texts, but that they must spend many hours in laboratories where they actually see, touch, handle the processes and organisms they are interested in. If the most descriptive level attainable verbally represented the apex of knowledge, why would medical schools bother to give students their years on the wards? Why would chemistry departments make students go through long, four-hour laboratory sessions day after day? Why not just send them out after passing a course in the textbook materials to do blood chemistries and make T.N.T.?

Now in the verbal levels, the process of abstracting goes on also. We may represent this first level that we have been talking about as the level of language that is customarily used in a chemistry or physics or anatomy text. In the first place, there is high word-fact agreement amongst the experts using these descriptive terms. The labels here refer, or tend to refer, to one or to a very few events. For example, the term "mandibular bone" refers to one more or less highly separate region in the human anatomy; whereas, the term "terrible" or the words "democracy" or "truth" or "character" refer to many, many possible events or objects or processes in space-time. A second characteristic of descriptive language is that it has a high orientating value. If you have a map of Los Angeles which has every street indicated on it in the correct relations, the map

has splendid orienting or directing value. You are very likely to locate the street you are looking for upon it, and consequently, to get there. Likewise, with verbal maps, if they are stated at the descriptive level, you tend to get where you started out to go. The simplest examples come from everyday directions. A patient recently told me of an incident wherein she had promised her sister to meet her at Sheets' on Seventh Street in Los Angeles at two p.m. Now there are two Sheets' on Seventh Street in Los Angeles, and the sisters waited at the separate stores one-half hour before realizing their situation. This would not have happened had they been a little more descriptive, put in a few more details. Almost every motorist of the pre-Southern California Automobile Club days remembers the old road directions. The farmer who told us to turn after we crossed the bridge, or in front of the yellow farm house, or across from the speckled cow, often got us into trouble, because there were several bridges, and a herd of cows, and we were not sure of the color of the house. Religion and the old schools of psychotherapy also give highly non-descriptive orientations or maps. They tell us to be "unselfish", or "to want not to be neurotic", or to "be uninhibited", or "to be courageous", or "to be mature". Just exactly what specific neuro-muscular activities we are to engage in at say ten o'clock on any given morning on our road to peace and happiness they do not tell us, and General Semantics necessarily believes they can not tell us because their language is not descriptive and has therefore low orienting value.

This far the levels of abstraction have been clear cut, and we have been able to differentiate them rather adequately. From here on up all we can say is that we are getting more and more abstract, leaving out more details, making statements about statements about statements, and so on. In other words, man is an organism capable of using indefinitely higher orders of abstraction, and herein lies the major cause of disorientation and distortion in symbol interpretation. Herein lie the factors of vital importance to the field of the psychology of reading. To use semantic principles myself and make clear just what I mean, I will have to give you some general principles which distinguish these higher orders of abstraction from the more descriptive levels. Also, I will have to give you examples of language at these different levels of abstraction.

One difference between very descriptive language and very abstract language is that the very abstract language exaggerates and this is of immense importance in neuro-psychiatry and clinical psychology. Patients complain that "people don't like me." And upon questioning them it turns out that a certain Mrs. Jones frowned at them yesterday at two o'clock. It is seen there that the statement "people don't like me" represents a tremendous exaggeration, but an exaggeration which is acted upon or regarded as being at least a somewhat accurate picture of the facts. In using General Semantics in psychotherapy we train patients to substitute descriptive language for abstract, and what used to be called their "emotional state" or "mood" clears up. It partly clears up because of the less frightening implications of descriptive language. You have perhaps noticed this characteristic of abstract language if you have observed the language of someone whom we term "excited" or "upset". They will tell you that everyone in a wreck was killed, or that everyone is talking about

them. Or we hear more frequently this summer, that the whole world is mad. Or, as Mr. Kennedy was reported to have said to President Roosevelt at the beginning of the European war, "It's the end of the world--the end of everything."

Another way of referring to this character of abstract language is to call it "allness". I will leave to Dr. Campbell the task of portraying to you some of the neuro-physiological consequences of an "allness" orientation. Briefly, I might indicate its importance here by saying that people who have an attitude of "allness" are not using etheir cerebral cortex to delay and inhibit the thalamic region. The cortex has been developed to give delay, differentiation, differential activation. When it does not inhibit the lower thalamic centers, they get out of control, and when they get out of control, the various functions which are regulated in this region are disturbed, and it must be remembered that the involuntary nervous system and the glands of internal secretion are regulated in this region. Dr. Alvarez of the Mayo Clinic reported recently that jitteriness, high blood pressure, sleeplessness, abnormal wearisomeness, are results of this center not being properly inhibited by the cortex. A fuller discussion of this lies more properly in Dr. Campbell's subject. I speak of it merely to relate a certain characteristic of language "allness" or exaggeration to certain pathological conditions which are widespread. This feeling of "allness" dominates a politician when he makes statements beginning "It is practically unanimous opinion of the American people that...". It was to be observed in Mr. Green of the American Federation of Labor when he said that "Practically everyone in America believes that Mr. Bridges is a communist." Now, of course, as that highly reliable statistical instrument, the Gallup Poll, has shown, the American people do not speak out on almost any issue with one voice. Rather they speak in percentages-- 10 or 20, or 40 or 90, etc. One prime contribution of General Semantics to the field of reading, then, is that it teaches us, by being descriptive, to differentiate. This saves us much personal grief in eliminating exaggeration, it protects us from demagogues who tell us what all the people believe.

Another characteristic of highly abstract language is that there is a low word-fact agreement amongst the given human organisms using it. It will be of importance here to remember the data of Johnson, quoted at the beginning, which tends to show very low word-fact agreement in the case of certain commonly accepted terms. This disagreement as to the referents, the non-verbal events, that highly abstract words refer to, is of tremendous significance. It is at the basis of most human disagreement, all the way from small confusions and arguments up to such large clashes as that, for example, between the ideology of Nazism and the ideology of Mr. Hull. The higher your abstractions, the less human organisms will be thinking about the same event you are thinking about when you use them. When you refer to a new 1940 Ford roadster, there is a certain agreement in the neuro-logical representations evoked by that word in the nervous systems of your listeners. When you refer to "democracy" or "fascism" or "inferiority complex", the chances are extremely high that you have one brain representation and each one of your listeners has a vastly dif-

ferent brain interpretation. You don't even have to measure word-fact agreement on such a term as "democracy" when you stop to consider the number of different political movements we have in the United States all fighting each other, and fighting for "democracy". If you were to examine the language of the leaders of these warring movements or blocs, you would find at the bottom, amongst other things, certain basic disagreements over the referents of the terms used. In General Semantics we have a way out of these disagreements, because we train people to say "wait a minute, let's stop and see what we are using as referents or nonverbal events to relate our terms to." But in the old way of unconscious acceptance of language, these disagreements due to the indiscriminate use of vague eye abstractions, were insoluble. All we could do was to stand and shout at each other, get our blood pressures up, get irritable and tense, exaggerate and finally fight.

Another and most vital characteristic of higher order abstractions is that they introduce dangerous, false-to-fact identifications. You will remember we defined identification earlier as the process in which an organism reacts to two separate stimuli as if they were the same. The Pavlowian dog which salivates to the sound of a bell as well as to the sight of meat exemplifies this process, and in Pavlowian language we term it "generalization of conditioning." Now since with the advent of language verbal symbols come to be substituted quite often for stimuli from outside the skin, it stands to reason that symbols relating to differing, discrete, events in space-time can be grouped together and thus cause the human organism to identify verbally. This has disastrous consequences. We can take a word such as "blood", referring to certain highly specific fluid coming from vascular systems of animal organisms, and then we can take another word,"banker", referring to a certain human organism going about certain duties in the concrete structure on a certain intersection downtown, and we can put them together and get "bloody banker". The tragedy of this process is that however logically, or sophisticatedly you think you are using this phrase <u>organismically</u>, you are going to carry over the word "banker" some of your primitive neuro-physiological reactions to the word "blood". It is not an adequate human orientation to carry over a neuro-physiological reaction from the word "blood" to the word "banker". It is a pathological identification, and yet when we use highly abstract, inferential language, we make these false-to-fact identifications continuously, inevitably.

The far-reaching significance of this identificational characteristic of abstract language may be dimly realized if you stop and consider that the language of advertising, the language of politics, two professions which effect our lives greatly, is permeated with identifications. If a politician has a certain waterworks, we will say, to put over at the polls and the electorate is not solidly for the waterworks, the politician makes a speech in which the electorate is told that the waterworks is an "American",a"constitutional" project. He uses the terms as "God", and "mother", and "American", which create favorable organismal responses,with the purpose in mind that these responses be transferred to the word "waterworks". He is utilizing deliberately, but without physiological knowledge ,

the conditioned reflex data of Pavlow. Advertising of course represents the sheerest bluff and trickery verbally, and it counts on the mechanism of identification. Listen to some typical 1940 advertisements: Big Ben alarm clock advertises: "I want an alarm clock for a man with big broad shoulders." Mercury car advertises: "So we headed the Mercury for Sun Valley." Quaker State Oil Company advertises: "Trust your car to the oil of character." In these examples broad shoulders and a big ben alarm clock are identified, Sun Valley and a Mercury car are identified, Quaker Oil and character are identified. The mechanism is obvious. "Broad shoulders" and "Sun Valley", and "character" represent terms reacted to favorably by a large proportion of the American people. The advertisers, by coupling these terms with the names of their products, hope to have the reading public carry over favorable, positive responses to these products.

In the language of our patients we observe deep and pathological identifications almost as the rule. My most serious patient this spring kept repeating over and over again, "I am caught like a rat in a trap." The crux of another patient's problem was expressed in his statement that "my wife is a moral tramp, a moral leper", and when he was asked to express the meaning of this in more detailed and descriptive language, his problem vanished. The language of the ordinary garden variety neurosis is amazingly identificational: "He knifed me in the back", "My professors are gouging me", "I am worn out", "He jumped all over me," "My nerves are all gone." Recently a case was reported of throat trouble in which no positive medical findings could be ascertained. Investigation was made and it was determined that the woman was greatly upset about her husband's bringing his secretary into the home, and was saying over and over again to herself, "I can't swallow it." Another case was reported of a woman patient reporting to a stomach specialist with stomach complaints. After a thorough check, no positive medical findings were made. It was discovered that the woman had to support in her home an aged and "crabbed" aunt. She resented deeply this intrusion into her freedom but repressed thoughts of revolt as disloyal, and kept saying over and over again to herself, "I wonder how much longer I can stomach it."

Human organisms cannot use these deeply false identificational mechanisms and survive either individually or nationally. Some type of breakdown always ensues because the neurological map of the territory in the nervous system of the human is grossly inaccurate.

In a world wherein the basic law is the law of non-identity, where every event in space-time is different from every other event, human organisms which manufacture delusionary similarities in their nervous systems cannot survive.

In training in consciousness of abstracting, we automatically get rid of identifications. The more descriptive you are the more your words refer to one or few discrete events in space-time. The more abstract you are the more your words refer to indefinitely many events in space-time.

When we refer to a 1940 Ford roadster, license number 8P-8849, registered to Mr. Herman Smith, Pomona, we are using descriptive language and are singling out of millions of automobiles one highly specific car. But when we talk about "personality" or "inferiority" or "good adjustment" or "terrible " or "horrible" we might be referring to anything on God's green earth, and the chance to make false-to-fact identification is huge. A text on human anatomy is a good example of the use of highly descriptive terms to refer to highly discrete and separate things, and there are very few identifications here.

I could go on for hours describing differences between levels of abstraction in language. It takes much reading and months of work to get a full appreciation of the implications of General Semantics. This is partly because we are investigating a field which we have previously regarded unconsciously and as obvious, and partly because we are constructing the outlines of a general scientific methodology and must review a good deal of science in order to do it. I hope I have covered enough to reveal some of what I feel to be the tremendous implications of General Semantics for the field of reading.

If we accept the premises of General Semantics and they are experimental and capable of being submitted to proof, certain general changes will have to be made in our whole attitude toward the reading problem.

For one thing, the general importance of language, as a conveyor of knowldege of the world outside our skins, has been dethroned. Never again can a person who has been made conscious of this process of abstracting about which we have talked a little, regard mere words with high reverence. With General Semantics comes a deep realization of the fact that words are useful only in so far as they refer to non-verbal events, and that they should be used at all only when we cannot look at these events with our naked eyes or through a microscope or with sub-microscopic inferences. Words, according to the data (notice I said data and not belief) of the general semanticist, should be used only after we have something to refer them to. We should fit our language, as Korzybski puts it, to the structure of the world about us, and not the structure of the world about us to our language. This involves silence and delay before bursting into speech. This has healthy neurological consequences, and I am hoping that Dr. Campbell will discuss these consequences in some detail. We go by what we can see and not by definitions, we evaluate actions as more important than words, we regard laboratory data as more important than speeches like this one, above all we ceaselessly demand of each human organism the answer to the irritating question "what do you mean?" And we want him to point to what he means and not give us a definition. I have only time to hint at this problem of orienting ourselves by what we see and not by definition but I want to give you an example of a man who asked what was behind words and did not take them according to their textbook definitions. I want to know how this man could have learned to do what he did by the usual rules of the psychology of reading.

The setting for this story was Berlin. The time-- just after the

return of Hitler from Prague. The occasion -- Hitler had called in the Polish Ambassador for a "friendly" chat. Hitler chatted pleasantly of his Czech triumph and then suddenly he turned to the Ambassador and began to talk of "new and closer co-operation with the Poles". It is reported the Ambassador excused himself hastily, raced for the depot, caught the Warsaw express, on his arrival there got Foreign Minister Beck out of bed, and by two a.m. they were routing reservists out of bed all over Poland. So did one man interpret the words "new and closer co-operation"! I submit that you could not learn this Polish definition in the dictionary.

And further when you do use language, after having had general semantics, you use it in full consciousness of its limitations; and what is even of more importance, you know how to check some of its confusing consequences. You know the differences between descriptive language and highly abstract language, and consequently you know how to free yourself automatically from the dangerous consequences of identification, exaggeration, disagreement, and low orientation value in language.

I want to point out, in conclusion, that this question of the relationship between semantics and reading is no mere academic problem. If you think it is an academic problem, I would recommend that you acquaint yourselves with some of the propaganda activities of foreign governments in this war. As Edmond Taylor in his recent book, "The Strategy of Terror", has pointed out, the use of propaganda or verbal trickery has become a major activity in modern warfare. Propaganda has become organized, scientific, a regular unit of the army. For example, according to Taylor, a regular psychological laboratory accompanied the German army into France. Radio broadcasting has been utilized with an amazing knowledge of the neurological effect of certain words. German announcers with English accents have broadcast propaganda to the British people. Recently there was inaugurated the first propaganda broadcast to America from Berlin, and this was by a supposed American with an unmistakable Iowa accent, who spoke with great knowledge of the life of Middle Western America. As Taylor pointed out, linguistic trickery has been mechanized, organized to a point of tremendous complexity and efficiency, and ranks right along with the army as an effective weapon in conquering a country. The new way to conquer a country is first to weaken it and soften it by propaganda, to divide its loyalties, to prey upon its class divisions, to exploit its internal disagreements, in general to weaken its resistance to war. And then, when the country is at its peak of internal confusion, apathy, and disagreement, strike with all the terror or mechanized warfare.

General Semantics may find its greatest service in the near future in the training of large masses of the population to recognize linguistic trickery. Only a methodology which looks deeper than words, looks to the bottom of the whole process of human nervous systems, manufacturing what they call "knowledge", is fit to undertake the problem of combatting worldwide propaganda.

READING THE ART LANGUAGE

Millard Sheets, Scripps College, Claremont

Dreams or imagination form the basis of all creative art.

Dreams may be termed vision perception. They may be concrete, solid, or earth-bound. The dreamer observes and recognizes the laws of nature from which he gains understanding and love of the earth. His dreams are reflected then by portraying the solidity of the earth.

There is the freer type dream or dreamer who has gone through the earthbound experience but is not satisfied. He reaches out and beyond and dreams and lives in a more unreal world. He interprets his dreams with a deeper or more spiritual quality.

Then, too, there is still the more visionary artist such as Albert Rider who reaches through the world of unrealness into that of fantasy. Shape, color, and line have a more kinetic sense.

The artist and the average layman differ in what they see or read from a scene or picture. The artist reads perception structure where light, color, line and texture are organized in terms of orderly composition or the expression of vision, a quality of mind, or a spirit. The layman's mind is more photographic, all inclusive of things and objects. He reads and admires imitations or exact replicas of nature. He reads and sees color pleasant to the eye. On the other hand, the artist's contemporaries are apt to become more interested in his language or personality rather than what the artist has in mind.

The question arises, what part should language play in art? Some schools of thought and psychologists state that discipline should be used according to ideas.

It is agreed that background is necessary for understanding art. The artist has real problems which take years of preparation-rigid and exacting disciplined study. First, there is the ability to observe. All have to be taught observation, to see around the surface of things, to traverse the ground they paint, to live through or feel the experiences they desire to portray. The eyes are a means while the mind and spirit give sense and understanding to what was observed. They should see things simply. Simplicity clarifies the scene while complexity of details confuses and bewilders. The artist should not become so engrossed with detail and surface that he is blinded to the depth and meaning underlying an object. For example, the structure of a tree -- the artist should have the ability to perceive and understand what lies back of it. He should feel how time has reconciled the phenomenon of life. He should learn to discriminate and evaluate light values. Too much light tends to destroy simplicity and brings about a confusion of textures, causing shape to destroy shapes. Some may desire to portray the world as a sense of structure, or colorful, exciting, orderly, an interesting place to be in,

or as a means of an escape, going into romanticism, thence into the visionary.

The artists of the Middle Ages still excel in the use of light, line, and color. By comparison their style was bolder and reached a vital and deeper understanding. Line and color was never lost but put together to form a complete and harmonious whole.

Today the average person of twenty has never really seen the world in which he lives. As an example of this, each year I have my new students make a figure composition. It may be large, and the figure may be doing anything. The result is always the same: heads, arms, legs, etc. are never set in correctly. Another lesson in observation is to ask the student to draw something he remembers. A shoe, for example, should be drawn to scale on the blackboard. Again, the conclusion is that people do not observe. Too many see surfaces and a complexity of detail. To see keenly is to understand the world in which you live, the landscape becomes alive, the trees and clouds take on a new meaning and you have a new interpretation and understanding of the things and people about you.

Perception starts with observation of things closest to you. Your own backyard, for instance, is a good place to test your first observation. Learn the basic facts of nature and you will learn to interpret art. Observation helps the development of style, manner, technique. Technique and method of expressing oneself is secondary to what you have to say.

Why do we want to know about art, the world, and the nature around us? It gives us the opportunity to know about life. Styles result. The Gothic and the Renaissance styles serve various purposes: architecture, furniture, laces, etc. Art also reflects and interprets the needs of a society or a community. Art aids us in escaping from reality. It helps us in our own homes. It aids in working out problems. It helps build society and beautifies our life. Art is simply a matter of living the common sense way.

GETTSVILLE BECOMES READING CONSCIOUS

A dramatic panel discussion of the reading problem as considered by school and community leaders of Gettsville

Peter L. Spencer, Ph.D., Claremont Colleges

The theme is developed around a broad conception of the nature of the reading process and upon a thesis that development in that regard is a primary concern of the school and community in cooperative endeavor.

Act I takes place in the library of the home of Mr. and Mrs. John Gettsit. Mr. Gettsit is a power in the business and industrial life of the city. His wife is comparably dynamic in social and intellectual activities. She has become interested in the problems of deficient reading and has resolved to see that something is done about them. Consequently, she has invited for dinner a select group whom she hopes to interest in working to that end. Her success is illustrated by accomplishments in the subsequent acts.

Act II occurs in the conference room at the office of the local superintendent of schools. A group of school and non-school persons has been called in conference by the superintendent as a direct result of the meeting held a few days previously at the Gettsit home. The discussion results in a request for a more adequate and functional conception of the nature of the reading process. A Dr. Insight, who appears to have some stimulating ideas on the subject, is invited to meet with the group to explain his views. He accepts the invitation.

Act III is the meeting with Dr. Insight. There the conception that "Reading is a mode of living" is presented and amplified. It is contrasted with the current idea that reading refers merely to the perusal of printed word symbols. Members of the group enlarge upon the conception and indicate how it opens for them new vistas which they propose to develop.

CAST OF CHARACTERS

Dr. Charles Jones, Superintendent of Gettsville Schools. Conservative.
Mrs. Jones, wife of the superintendent.
Mr. John Gettsit, wealthy, dynamic business leader of Gettsville.
Mrs. Gettsit, his wife and a leader in social and community activities.
Mr. Thomas ("Tommy") Smith, rising young journalist.
Mrs. Smith, Tommy's wife and a leader among the younger women of Gettsville.
Dr. Raymond Insight, eminent writer and student of human affairs.
Mrs. Insight, wife of the doctor.
Dr. Forest Whosit, Professor of clinical psychology.
Mr. Horace Aiken, Principal of Gettsville Union High School.
Miss Florence Pleasant, Principal of an elementary school.

Miss Eleanor Frances Strict, teacher of mathematics.
Miss Virginia Olds, teacher of English.
Mr. Alfred Block, teacher of science in Gettsville Junior College.
Miss Alice Wright, teacher of grade one in an elementary school.

ACT I

Scene: The library of the Gettsit home. The dinner guests have retired there for coffee and conversation. They are arranged standing or seated in convenient social groupings. Mrs. Gettsit is serving and general small talk is being enjoyed. Stories are told which produce laughter and tend to break down the reserve common among groups with widely different interests and backgrounds. Gettsit thinks of a story which he wishes to tell. His wife, evidently fearful of his stories, quickly sends him out to obtain more coffee . He returns to find his opportunity lost.

Mr. Gettsit:
By the way! Have you people heard the story about a young man who met an attractive young woman with a dog?
Mrs. Gettsit: (evidently much disturbed)
John! I'm sorry, but we need more coffee. Please get it now.
(Gettsit looks abashed and sheepishly obeys. The others are politely amused. Smith rises to the occasion by offering another story.)
Mr. Smith:
Speaking of stories, this is one which I'm sure you'll enjoy. It is of particular interest to Dr. Jones, since he is an educator. It seems that the teaching of reading has become very realistic for some of the children. A few days ago a friend of mine was surprised to see his young son suddenly arise from his chair where he had been reading, go to the fireplace, lay and light a fire, spit upon the hearth, and then solemnly step on the spit and turn around. The father, much amused at the ceremony, asked what it all meant. The boy replied that his teacher had told him, if one had trouble in understanding a sentence, the meaning might be made clear if one acted as the sentence indicated. The father was much impressed by the sense of the instructions, but he wondered what the sentence could have said which could be correctly enacted by the behavior he had just witnessed. He asked to see the book. Imagine his surprise when he read this passage:

"Upon the hearth the fire was lit,
The kid was turning on the spit."

(General laughter)
Mr. Gettsit: (with great gusto and joy)
Say, did you ever hear that one about the bathing beauty that ---
Mrs. Gettsit: (not wanting this to go any further)
John dear, why don't you and Tommy finish the chess game you started before dinner?
Mr. Gettsit: (forgets his story and looks around at the group)
Does anyone object? (General remarks, such as -"Good gracious,no",etc.)

Mr. Gettsit:
Come along then, Tommy, and we'll fight it out to a finish!
(They go towards the chess table.)
Tommy:
Say, the one we played last week was a GORY affair, wasn't it?
Boy, I never scrapped so hard in my life, and then to have it turn into a stale mate!
Mr. Gettsit:
Four hour battle too, wasn't it?
Tommy:
I'm going to unlimber my heavy artillery now, so dig in.
Mr. Gettsit:
It's the Nazi Blitzkrieg your're up against, my boy!
Tommy:
This Queen here is going to be my mechanized force.
Mrs. Smith: (After a pause)
Just a couple of frustrated soldier boys.
(General laughter)
Tommy:
Say, just a minute, I didn't get any sugar for my coffee. (goes to table).
How about a lump of sugar?
Mrs. Gettsit:
Where's your ration card?
Tommy:
Huh?
Mrs. Gettsit:
Here. (gives him sugar). Now get on with your war. (Tommy goes back to game.)
You know that joke Tommy told a while ago about the boy acting out what he read isn't so far fetched at that. The words, kid and spit, have both suffered change in their common meanings since those lines were written. It must be very confusing to children to meet with such statements. But I suppose it would be even worse for one not to be able to meet them at all. Dr. Jones, what do educators think about the inabilities of so many children to learn to read?
Supt. Jones: (caught off guard and startled)
Why! We scarcely know what to think. Why do you ask?
Mrs. Gettsit:
Last week, before the Parent Education Club, one of the mothers gave a paper on the subject. She gave some astonishing figures concerning the prevalence of reading deficiencies among school children. She made us wonder what the schools are doing about the problem.
Mr. Smith: (looking up from his game)
Someone is always wondering what the schools are doing about something or other.
Mrs. Gettsit: (continuing)
For one thing, she said that about fifteen per cent of school children are apparently unable to read effectively. Also, she stated that many more boys than girls are found within the deficient group. I believe the ratio was about four to one. She surprised us again by pointing out that for the most part the group is not below normal in intelligence.

Many of them appear to be really superior in that regard. Dr. Whosit, this is your field -- she said that most of the children who are sent to the Guidance Clinics are found to be retarded in reading ability. Do you find that to be the case?

Dr. Whosit:

Yes. It certainly is true. We have come to suspect that condition in each new case we receive. Among our most commonly used techniques are tests for reading deficiency.

Mrs. Gettsit:

That is what the mother told us. Her points startled the members of the Club. We became interested to learn more about the problem and to find out what schools are doing concerning it. What are our schools doing to meet this situation, Dr. Jones?

Dr. Jones: (somewhat disconcerted)

Why -- they are doing about everything that can be done, I believe. You realize, of course, that the teaching of reading has been compulsory in our country for almost three hundred years. During that time teachers have been very conscientious in handling the matter. In the past only a small part of the potential school population ever really attended school regularly. Of course, the teachers were handicapped in trying to teach them. Now, however, most of the children are in school. Naturally, some of them are poorly adapted for school work and they are having a difficult time. While, as yet, we are unable to make silk purses from sow's ears, the schools have accomplished rather remarkable results with the education of the nation's children.

Mrs. Insight:

Few people will question that, but are they doing all they can?

Supt. Jones:

Well, you know, the available money for school expense has not kept pace proportionately with the increase in the school population and the expansion in the nature of the school's offering and responsibility. I don't see how they can do much better unless more funds are made available. And that is a problem which is largely beyond the control of school people.

Mr. Smith:

But reading is such a vital necessity for social understanding I should think that teaching pupils to read would be a first responsibility for the schools. Almost everything of importance is found in print. If one cannot read it, how is he to know what's going on around him? Many grown people rarely read even such things as the newspapers. How can such people be intelligent voters?

Dr. Insight:

How do you account for the fact that someone must have thought each idea before it could be recorded in print?

Mrs. Whosit:

That's a good point, Tommy! Furthermore, I suspect that your illustration was poorly chosen. Suppose every person had a high level of reading ability and that all read faithfully the accounts presented in the daily papers, what assurance would we have that they would be intelligent voters? You know how accounts are twisted and distorted to suit the poli-

cies of certain interests. It doesn't seem to me that ability to read with facility is sufficient to make a voter intelligent.

Mrs. Jones:

That's true enough. Words are used to express false information as well as the truth. In fact, it seems almost that falsehoods are more easily and more attractively expressed. The propaganda and dramatic appeal found in much of the advertising, the distortions and half-truths given out in political speeches, even the subtle inferences implied in books and magazine stories, all make one wonder whether teaching people to read has really been socially profitable. It seems that we ought, if possible, to educate against propaganda.

Mr. Gettsit:

But how can one educate against propaganda? How do you know what is propaganda and what isn't propaganda? And, then, is all propaganda bad or vicious? Isn't it possible for a statement to be propagandistic and yet to be the truth? In a way it seems that about everything we do or say is a type of propaganda. Just now it appears that if one person says something it is propaganda, whereas some-one-else can say the very same thing and it isn't considered propaganda. For example: my advertising manager wished to print some attractive booklets illustrating and describing the manufacture and use of some of our products. We planned to supply them gratis to interested teachers who might make use of them in connection with their work. Most of the material they are now using is out of date and some of it is positively wrong. However, upon investigation, we found that such practices are frowned upon and teachers who use materials of that nature are termed "propaganda pedagogues". Not wishing to cause embarrassment or trouble, we gave our material to a professional writer of school textbooks. He used it with practically no alterations. His books were sold to the schools which we proposed to supply free of cost. Neither the material nor the textbook writer has been criticised. Consequently, I ask, how can you distinguish propaganda?

Tommy:

Check!

Mrs. Gettsit:

This discussion has been very interesting and informative. But surely there is something which can be done about this problem. Everyone seems to be aware of a need for something's being done, but no one has suggested a way of doing it.

Mr. Smith: (chuckles)

That reminds me of a story. An Indian was elected to membership on a schoolboard. Soon afterward a convention of schoolboard members was held in a nearby city. The other members of the board thought it would be fun to send the Indian as their representative to the convention. He spent three days listening to speeches and participating in the work of committees and what not. Upon his return home, the board called a public meeting to hear his report. Everyone knew that the Indian could neither read nor write, so they were much amused by the proceedings and enjoyed thoroughly the chairman's introduction of the new board member. However, when the Indian's time for speaking came, he surprised the group by the brevity and yet the pertinancy of his remarks. He arose with great dignity and said, "Big wind. Much noise. No rain." (Laughter)

Mrs. Gettsit:

That's a good story, Tommy. However, I propose to change the weather if it is humanly possible. It terrifies me to think that there are people who are otherwise normal but who cannot learn to read. Do you not agree with that, Dr. Insight?

Dr. Insight:

Yes, in a way. I agree with what the words mean to me, but I suspect that they do not mean the same thing to all of us. That sounds a bit involved, but it is a characteristic which words seem to possess. For example, the word reading has many different meanings. Most of what has been said this evening has been addressed to a very narrow and restrictive definition of the reading process. Back of all the statements I seem to sense that the speakers were thinking of reading merely as the ability to recognize printed words on a page. Now, isn't that what you had in mind?

Mrs. Gettsit:

Why, yes, certainly! Is there any other kind of reading?

Dr. Insight:

Surely there is. Printing, as we think of it, today, is of very recent origin. Movable type was invented only about five hundred years ago. The human race read long before that occurred. They read manuscripts of various kinds. They read human and animal sounds and behavior. They read the movements of heavenly bodies and devised many ways of measuring and interpreting things of nature which we still find adequate and useful today. In the past full and effective lives were led even though they were affected little or not at all by printed word symbols. I see no reason why some such condition cannot exist at this time. Mr. Smith stated a moment ago that "everything that is important is found in print." That is a very common idea today but I believe it is fundamentally wrong. People must think ideas before they can record them in print. Why should we not strive to secure original thinkers as well as trying to develop efficient users of the recorded symbols for other person's thoughts? Conceived in a broad sense the term, reading, is the process of interpreting one's stimulus situations. Really it "IS A MODE OF LIVING." In that sense, Mrs. Gettsit, I agree that it is serious when one does not learn to read, for such a person does not live intellectually; he merely exists biologically.

Mr. Smith:

Reading is a mode of living. That <u>is</u> a new idea.

Dr. Insight:

No. Not at all. It is as old as man. The new idea is the association of reading exclusively with printed word symbols. One reads whenever one interprets the situation affecting him and when one tries to make a sensible adjustment in conformance with his interpretation. To be unable to read in that sense of the term would imply that all meaning would be taken away from behavior.

Dr. Whosit:

Considering what our behavior is at times, maybe that would be a good thing. (Laughter)

Mr. Gettsit:

Say, did you ever ---

Mrs. Gettsit:
Don't you want some more coffee, John?
Mr. Gettsit:
No!
Mrs. Gettsit: (sweetly)
Perhaps it's your turn to move, John. (turns to Dr. Insight) But under those circumstances there would be no people. If I understand you correctly, we survive because we are able to make discriminating adjustments and because we can make meanings fitted to our situations.
Mr. Smith:
By George! That is an idea! Do I understand you, Sir, to say that according to your concept all the reactions we make to the countless stimulations which affect us during a day are governed by reading? For instance, this coffee cup has served its purpose and I dispose of it by placing it on the table. Have I performed an act of reading?
Dr. Insight:
You certainly have. You sensed a problem, namely, to dispose of an empty coffee cup. You might have thrown it away.You might have put it in your pocket or dropped it on the floor. You might have chosen to do with it one or more of any number of things. But you selected a mode of behavior best adapted to the situation and placed the cup carefully on the table. You feel more comfortable than you would have felt had you misbehaved in this situation.
Mrs. Gettsit:
What a strange idea of reading that is! I had never thought of it in that way! I had always supposed that reading meant reading a printed page. Now, you say it doesn't mean that at all!
Dr. Insight:
I am afraid that I have not made my idea entirely clear. I did not mean to say that the reading of printed words is not true reading. It most certainly is. But, what I am trying to say is that it is not the only type of reading which we perform and that it is not the most fundamental type of reading.
Supt. Jones:
You certainly have a point there. We use many other types of reading in schools, but for some reason we seem rarely to think of them when we speak of reading. We have children read music, numbers, maps, graphs, charts, diagrams, blue-prints, pictures, and many other things. Of course in a sense these are all word symbols, but they differ widely from the ordinary printed word symbol and to read them must require rather different techniques.
Dr. Whosit:
That is true! But I suspect that Dr. Insight would go much farther in classing school behavior as reading. It seems to me that he is saying that all responses which are made with judgment are reading responses. That is decidedly a very broad and inclusive conception of the reading process, but for the life of me I can see no reasonable objection to it.
Mrs. Insight:
Since we have been talking, I have tried to recall different common usages for the term, reading, which do not imply the presence or use of printed word symbols. For example, we say one reads tea leaves, palms,

faces, motives, measuring instruments, the stars, clouds, and really all manner of things. Truly, it seems that reading printed words is really only one instance of a much more prevalent form of behavior.

Dr. Whosit:

Frankly, I hadn't thought of this idea previously, but as it was presented I began to realize that such a conception is more generally held than many of us are aware. I recall now how surprised I was at the number of definitions for reading given in the dictionary. I remember one or two illustrations given there which impressed me but didn't arouse me to sense their significance. These lines are quoted. I do not recall the authors. "You, who men's fortunes in their faces read", and "She did not read him right".

Mrs. Smith:

That is interesting. I'll have to look in our dictionary. This idea of reading certainly sounds sensible and may I say encouraging. I have been dreading the time when our little Joan will have to begin to read. She is only four years old but she asks such searching questions. As I listened to this talk I began to wonder whether Joan really isn't reading already and whether she hasn't been doing so for ever so long. If she truly is reading, I'd be the happiest and the most relieved mother in the world. I have heard so much about children who cannot read and about some children getting words backward and having such a terrible time. Oh! If we could only feel that our children could be brought to read without its being an ordeal.

Supt. Jones:

My dear! You have no cause to worry. Your Joan is undoubtedly more intelligent than most children and there have been reports of studies which indicate that children who have attained a mental age of six and a half or seven years are ready to be taught to read. She will be well above that age by the time she enters school.

Mr. Gettsit:

That is all very well, Dr. Jones, but Mrs. Tommy raised another point to which you didn't speak. She stated that, as she understood the evening's conversation, it means that her little Joan <u>is reading now</u> and has been doing so for some time. Personally, I think she is right. Her comments remind me of a little talk I had with the janitor at my office. He can neither read nor write words, but he is the best janitor we have ever had about the place. He knows just what each of us wants of him and he does it to perfection. He is a pleasant and stimulating old fellow with whom to converse. Only a few days ago I was talking with him. He said: "There was a time when I felt might sorry that I could not go to school and learn to read like some of the boys was doin'". I said: "It is too bad but you can go to school now if you really want to learn. There is a night school for grown people here in the city." He said: "Yes, I know that, but I done lost interest in learning to read books." "What caused that?" I asked. He replied: "The kids in my neighborhood. I have watched 'em grow up and go off to school to be educated. They used to be interested in everything and everybody. They used to see plenty of things around 'em to talk about and to play and work with. They was real resourceful. But since they learned to read books they set around

with their noses in a book morning, noon, and night. They don't see things any more. They live only in a world of books. When I ask 'em what the books say they just look at me and say, 'you wouldn't understand'. Maybe I'm dumb" he said, "but I can see lots of things that interest me and I can talk about 'em too. Those kids -- they can just read books and they can't tell you what the books say. I ain't sorry no more, 'cause I want to live where I can see things and people and enjoy them. People and things ain't in books."

Mrs. Jones:

Do you think it is quite fair to criticize the schools because of the remarks of an illiterate janitor? I'm sure that I find people and things in the books that I read. And I'm equally sure that many of the school children do also. Teachers have a thankless job in trying to teach children who have no background for what they are to learn and very little interest in learning it.

Dr. Insight:

Why do you think they should be thanked for trying to do such a thing? It seems to me that we should condemn such behavior rather than thank the people who engage in it. Children have both the desire and proper backgrounds for learning if the circumstances are properly arranged. To attempt to teach without them is wasteful if not downright futile. There needs to be a close adaptation of procedures with abilities in learning. Schools have placed undue credence and emphasis upon one particular type of behavior, the reading of the printed page. This is responsible for the impression that recognizing and calling words is equivalent to understanding the meanings which they represent. I suspect children sense that the two things are not equivalents and they are being asked to perform the one of lesser importance. That being the case it seems to me it should be a thankless job of the teachers.

Supt. Jones:

That really is quite an issue. It seems that our host's janitor sensed essentially the point you are making. It may be true that training with one type of learning interferes with development in another. I suspect that there is considerable truth in the charge that schools over-emphasize the book reading aspect of learning. There are many ways in which learning can be stimulated. Perhaps we have been guilty of neglecting them. Possibly Shakespeare had something like that in mind when he had the Duke say:

> "And this our life, exempt from public haunt,
> Finds tongues in trees, books in the running brooks,
> Sermons in stones, and good in everything."

Mrs. Jones:

There, now, that's enough, Charles. When you get to the place where you start reciting poetry it's time to go home.

Mrs. Insight:

It really is getting late and early tomorrow we plan to leave for the beach.

(All make general reference to leaving and arise to go.)

Mrs. Gettsit:
Well, you must all see the patio before you leave. John has arranged some new and unusual lighting effects for the pool and around the garden.
Mrs. Jones:
We'd like to see it.
Mr. Smith:
I guess you've checkmated me all right.
Mr. Gettsit: (cheerfully)
You really think so, hey!
Mr. Smith:
Can't move here, nor here, nor there. Yep, that ties it.
Mr. Gettsit:
You're only one game ahead of me now.
Mr. Smith:
You got me on that queen and knight combination. I saw it coming but couldn't get my reinforcements up in time to block it.
Mr. Gettsit:
And I'll bet that flank attack didn't help matters any.
Mr. Smith:
I'll say it didn't. You got me in a pinchers movement.
Mr. Gettsit:
Say! That reminds me. I never did tell you the story about the young man and the young woman.
Mrs. Gettsit:
Now, John! You know it's too late for stories!
Mr. Gettsit: (determined)
No, it isn't. This one is a good story for people interested in reading. A young man in none too good humor was walking down the sidewalk. He noticed a young woman playing with a dog on the lawn in front of a large house. Just as he was about to pass, the dog spied him. The dog broke away from the young woman, ran out and snapped at the man's leg. The man quickly turned and kicked the dog, hurting it rather badly. However, the young man felt righteously indignant and stalked on well pleased with his part in the episode. The next day he again walked down the sidewalk. Again the young woman was out on the lawn, but the dog was nowhere to be seen. Taking more careful observation the young man recognized that the young lady was really very attractive and evidently well worth knowing. He hoped to make amends for his conduct. Seeing that she saw and recognized him, he stopped, tipped his hat and said in his most pleasing manner. "How do you do? How's the dog?" The young lady merely replied, "I did", and turned and walked into her home.
(Everybody looks blank- not catching the point.)
Mr. Smith:
Well, I say. Is that the whole story?
Mr. Gettsit:
That's all I know about it. Why?
Mr. Smith:
I don't get the point.
Mr. Gettsit:
That is probably how many of the children feel when they read stories with

a vocabulary unusual to them. Perhaps it will make it more clear but less humorous if we say, "How's the dog", and have the young lady reply, "I've already done so". Let's look at the patio.
(They start to go out.)

Mrs. Smith:
I still don't get the point of your story, John.
(Mr. Gettsit repeats the story as they go out.)

EXIT

ACT II

Scene: The conference room at the office of Superintendent Jones. The group enter engaged in more or less general conversation. They are as yet uninformed as to the purpose of the meeting. As they find places Mr. Smith proposes a story.

Mr. Smith:
I say, there are enough teachers here to enjoy a story I heard recently. It appears that there is a possibility for great danger in memorizing the rhymes and jingles so often taught to young children. At least it would seem so from this story. A woman was reported recently who, evidently on account of early conditioning in primary school, had married four husbands in this order: The first husband was a millionaire, the second was a Duke, the third was a minister, and the fourth an undertaker. Do you recall the saying which prompted her acts?

Mr. Aiken: (musingly)
First, a millionaire, then a duke, then a minister, then an undertaker. I, for one, see no connection with any saying I ever learned. Tell us what it was, will you, please?

Mr. Smith
Certainly. One for the money, two for the show, three to make ready, and four to go.
(General laughter)

Supt. Jones:
It happens that the story is more or less pertinent to the purpose of this meeting. I have invited you here with the hope that you will be able and willing to help us plan a program to meet a very trying problem. I hope you will pardon a play on words, but a superintendent of schools always has one asset to apply in finding solutions to problems. He can always call upon his faculties to help him. With that thought in mind I asked Mr. Aiken to invite members of his staff to join the group. Miss Pleasant was asked to represent the elementary schools' administration and to invite participating members from the elementary school staffs. Mr. Block is here as a representative of the faculty of the junior college.

The problem with which we are to wrestle has taxed abilities far greater than mine, so I do not feel remiss in asking for your help in its solution. Because the ramifications extend beyond the teaching profession I have asked some of our community friends and leaders to cooperate by becoming members of this group. Mrs. John Gettsit has always shown great

interest in the work of our schools and works continuously to make Gettsville a better community. Dr. Forest Whosit is doing a valuable service in his clinical work with problems of psychological adjustment. Mr. Thomas Smith, although only recently added to our community, has already earned our full respect and good will. You all know him, of course, through his column in the Gettsville Informer. Now that we all know each other and why we are here, we are ready to proceed with the problem at hand. We want to perform democratically. Does anyone have a suggestion as to a good way to proceed?

Mr. Aiken:

Pardon me, but we do not as yet know the nature of the problem to which you refer. You spoke of using your faculties but unless my psychology is at fault, one must be aware of a problem before on can marshall one's faculties to perform on it.

Supt. Jones:

I'm sorry. I must have assumed that all of us are aware of the most crucial problem that faces education today. Those of us engaged in teaching have certainly had sufficient contact with it, and only a few days ago I discovered that many people who are not members of the education profession are also becoming concerned with it. I believe Mrs. Gettsit ought to be asked to state the problem as it was presented recently before a group in her home.

Mrs. Gettsit:

Thank you, Dr. Jones. I presume you refer to the problem of developing efficient readers. I really appreciate this opportunity to bring it before a group of our teachers and to learn first hand what they feel can and should be done about it. Parents and other citizens are becoming alarmed over reports that many children cannot read and that high school and even college students are unable to read sufficiently well to accomplish the work assigned. We want to know from whence came this condition and what our schools are doing about it.

Supt. Jones:

I shall answer your challenge in part by pointing to this group. It is my hope that we may form of it a council which will endeavor to find out why there is so much difficulty with reading and what Gettsville, through its schools and otherwise, should do about it. But, first, perhaps we had better pool our present ideas concerning the problem. Mr. Aiken, do you find that our high school students have much difficulty with their reading abilities?

Mr. Aiken:

Your question, Dr. Jones, makes me think of a high school boy who was taking a difficult examination. He squirmed and scratched his head and in many other ways indicated that his going was not easy. The examiner thinking to be helpful and friendly, asked, "What is the matter, son? Do the questions bother you?" The boy replied, "No, sir. The questions are okay. It's the answers that bother me." I should say that a similar condition exists among high school students with regard to their reading abilities. It isn't their abilities with which we find difficulties. It is rather their <u>lack</u> of abilities to read which causes grief. Of course,

my administrative duties keep me from meeting the problem first hand as the teachers experience it. However, I have noticed that more and more complaints come from the staff to the effect that their students cannot read the materials which are assigned. A few years back that complaint was rather rare ,but I should say it occurs now at least a dozen times each week. Many of the teachers have begun to wonder what change has occurred in the elementary school which may explain this lack of ability among incoming students. In fairness to the elementary schools I should like to say that I personally doubt that they are entirely to blame.Doubtless there are many factors operating to produce the condition, but beyond question the inability of the pupils to read effectively is a very grave problem with the secondary schools. If you don't mind, I'd like to ask Miss Strict, of our mathematics department, to state what she has observed in this regard.

Miss Strict: (agitatedly)

Now, Dr. Jones, Mr. Aiken knows very well what I think about this deplorable condition. We had a conference about it only last week and I told him then that it is just simply impossible for me to cover the work expected in mathematics when the students come to me with such utter lack of ability to read the textbooks. When I was in training for teaching, we were told that during the first four years of school, children are supposed to <u>learn</u> to read and that thereafter they <u>read</u> to learn. Well! If that is the case, most of the children who are now coming to high school seem somehow to have missed those first four years.

Supt. Jones:

Oh, come now, Miss Strict, some of the children must know how to read, surely! Certainly they are not all so poor as you imply. What per cent, would you say, are really unable to read your assignments?

Miss Strict:

Of course, not <u>all</u> of them are failing. That is quite true. But only recently Mr. Aiken and I were looking over the reading-test scores of this year's ninth graders. We found fully half of the group ranked below the ninth grade norm. Many of those who are in the lower group in reading ability are having trouble with their mathematics assignments. When practically half of the pupils are below grade in their basic reading ability, I must say that I think the elementary schools should do something about it.

Miss Pleasant:

I should like to speak on that point, if I may, Dr. Jones. As the principal of an elementary school, I feel that I should come to its defense when such charges are expressed.

Supt. Jones:

Go right ahead, Miss Pleasant. Of course we all recognize that nothing personal has been intended by any of these remarks. We are merely expressing our views. It is ideas and not personalities with which we are concerned.

Miss Pleasant:

I understand that perfectly. And it is to the ideas expressed that I am taking exception. For example, the statement was made that fully one-half of the present ninth grade rates below the norm for that grade

in reading ability. I have no doubt but that such is the case, but when one says that that condition is abnormal, or when it is interpreted as indicating that the elementary schools have been remiss in their duties, I must object to such an interpretation. As I understand the term, the norm for a grade is the mid-point of the range of scores actually made by pupils within that grade. In that case, of course one-half of the scores would be lower than such a norm. That's what the term, norm, means. It follows then that Miss Strict's statement shows quite clearly that the elementary schools have taught reading as effectively as it is being taught by other schools of this country. There may be a point to the idea that such an attainment is not as great as it should be or as it could be, but my point is that the figures cited do not substantiate the claim that the elementary schools are mainly at fault for the inabilities for secondary school pupils to read their assignments.

Miss Strict:

I'm sorry if my comments seemed too abrupt. The inability of our students to read is a very sore point with us high school teachers. I do not understand altogether your point about the norm. However, I should like to ask if it is not true that in the past we were told that it is the main function of the elementary school to teach children to read?

Miss Pleasant:

Yes, your statement that for the first four years children learn to read and thereafter they read to learn has been commonly made. But lately, however, many question its truth. That statement was made in a time when the work of the school was thought to be largely a matter of habits. Today there is a broader conception of what the school contributes. Reading is more than recognizing words. It involves getting the meaning of what is read. That being true, how can the elementary school be expected to teach the high school meanings for the words which children will need only when they reach that level. Reading is not so much a thing which one learns and then practices, as it is something which one must continue to learn as one continues to experience. That being the case, the way in which the high school subjects are taught may be largely responsible for the difficulties which the students experience with work there.

Miss Olds:

I think Miss Pleasant has made a very valuable suggestion. We teachers of English are a bit sensitive concerning this problem because it seems that wherever there has been any attempt to remedy the reading situation the English departments have been saddled with the responsibility. This seemed to imply that the teachers of English were somehow responsible for the situation in the first place. In regard to Miss Pleasant's statements concerning the norm, I quite agree with her although I confess I had never thought of it as clearly as she presented the case. And I heartily agree with her other statement, also, that the high school method of procedure is most likely the basis for the student's difficulties. You may be interested to know that the National Council of Teachers of English has taken a very definite stand in that regard.

Mr. Block:

Miss Olds' remarks make me wish to add to one of the points she made. As a teacher of science, I also find that many of my students have difficulty

with reading the available materials, but strange to say, some of those who have the most difficulty apparently have no trouble at all with the social studies or English. Likewise, some who do very acceptable work in science do a much poorer type in the other fields. I have frequently wondered how a teacher of English would go about it to teach pupils to read the materials of a science. I have also wondered what I would do if I were asked to teach a group of failing students how to read English literature. Aren't there many kinds of reading? And doesn't each teacher really have to be a teacher of reading in so far as the literature of his field is concerned?

Supt. Jones:

That sounds like a fine idea, Mr. Block. I think we ought to explore it farther some time. I wish you'd continue to think about it and expand your ideas in more detail sometime. Miss Wright, what do you have to say concerning reading in the first grade? Perhaps if we start far enough down we can come up properly.

Miss Wright:

Dr. Jones, we teachers of primary children are often times bewildered by the comments made by the teachers at other levels in the system. We sense so keenly that the little folks whom we teach need to obtain a proper start in order, as you expressed it, that they also may come up properly. In our attempts to find out how to do this most effectively we have discovered something that perhaps you might like to share with us. Our little folk have very short attention spans. They are full of curiosity about things, but they flit from one thing to another very readily. They need to examine things with their fingers many times. They often lack words with which correctly to express their ideas, but nevertheless they think. We have been so often hounded by the demand that we teach these little people to read words before they have meanings for the words they are learning, that we have come to a state of rebellion. In fact, many people are saying that reading should be eliminated from the first grade, but I cannot accept the idea. It seems to me that it gives a wrong impression of our work and that it will not in the end help to solve the problem of reading. I like to think of <u>all the activities of these children as being reading in its most primary and basic sense</u>. It seems to me that the children are reading when they play with their toys or with each other. I believe they are reading when they construct things and when they dramatize. As they develop ideas, they more and more turn to words, but then the words have a definite meaning and use for the children. Perhaps I am wrong, but it seems to me that if we are to start at the beginning and come up properly all of your work must be based upon meanings. I wish Dr. Whosit would tell us whether that idea is psychologically valid.

Dr. Whosit:

I can see nothing invalid about it if it is properly carried out. In psychological adjustment work we frequently find children who do not read word symbols effectively for the reason that the words have no real meaning for them. We have found also that some children are unable to recognize word symbol forms until they have had extensive experience with tracing forms. It seems to me that the emphasis upon meaning which Miss

Pleasant stated and your ideas are similar to an unusual and interesting conception of reading that Dr. Insight expressed a few evenings ago at the home of Mrs. Cettsit. He spoke of reading as being a mode of living. I think we might find it to our advantage to explore further that point of view.

Mr. Smith:

That is what I was just about to suggest. Fortunately, I was present at the dinner meeting mentioned. I confess that the breadth of Dr. Insight's conception of reading was rather hard to accept for a moment, but the more I thought of it the more convinced I am that such a conception of the problem will aid greatly in our understanding of it. Certainly Something must be done to develop intelligent readers. With a new war in Europe and a major political campaign beginning our own country, it seems evident that a very high reading ability will be needed in the next few months. I am very much concerned with the ideas presented by Huse in his book, "The Illiteracy of the Literate". He thinks that much of the work in schools has resulted in making "verbomaniacs" of the students. As Roy Cohen would put it, "dey sez words but dey don't mean nothin'". Since Dr. Insight has so definite an idea of this problem, why would it not be a good idea to ask him to present his view to us in some detail?

Mrs. Cettsit:

I'm sure he would. I think that is an excellent idea, don't you, Mr. Jones?

Supt. Jones:

I surely do. I know of no better way for this group to start to function. How do the rest of you feel about it?

Mr. Aiken:

I'm for it 100 per cent if it will help us to get better readers in our high schools.

Miss Strict:

Yes, anything will be better than what we have to put up with now.

Miss Pleasant:

It certainly meets with my approval.

Dr. Jones:

Very well. Then it is agreed that we ask Dr. Insight to tell us his ideas concerning reading. We'll meet again as soon as he can be with us. I'll let you know as soon as possible.

(Business of gathering themselves together to leave the meeting. Curtain falls)

ACT III

Scene: Conference room at the office of Superintendent Jones.

Characters: Same as Act II with the addition of Dr. Insight.

General conversation finally brought to common focus by Mr. Smith.

Mr. Smith:

I suppose you have all been thinking about the various types and occurrences

of reading problems since last we met. I heard a story which is pertinent to our meeting, I think. It seems that a college president spent his vacation far back in the mountains where pioneer conditions still exist. While tramping around he came upon a log cabin in which lived a man and his family. The college man asked whether he might spend the night with them. He was invited to do so and everything possible was done to assure his comfort and entertainment. Upon the president's return to his home he wanted to express appreciation to his mountain host, so a letter was dictated, typed, and sent out to convey the president's thanks. However, the typewritten letter didn't accomplish just the results the college man had in mind. When it was delivered to the mountaineer he opened the letter and then said with evident chagrin, "Why for does he write me readin' when I kin read writin'?" (Laughter) The variety of meanings for rather common words in that expression should delight this group and I thought it might bear upon some aspects of our problem.

Supt. Jones:

It certainly does apply. Reading has been so commonly associated with printed words that we often get confused in trying to think of it in any other relationship. We are fortunate in that Dr. Insight has agreed to meet with us today and to discuss with us his interesting views on the subject of reading. He should be here almost any minute. I think that he would appreciate our having some questions to ask which are of general interest and which will open the problem which we wish to discuss. Will you be thinking of some during the interval before his arrival? (Buzzer announces Dr. Insight has arrived in outer office.) Here he is now. (Arises and goes to meet Dr. Insight at the door. Dr Insight is greeted and introduced to the group.)

Supt. Jones: (addressing Dr. Insight)

Dr. Insight, it is most generous of you to take the time to meet with us. However, in a way you are mainly responsible for our having met at all in this relationship. Those of us who heard your comments concerning reading a few days ago were so impressed with their educational and social implications that we formed this group to serve as a council for the study of reading problems. I believe various members have some questions which they would like to ask of you.

Mrs. Gettsit:

I have a question which I should like to ask. Recently we have been hearing many comments with regard to the lack of reading ability. Many people appear to think that such inability is the cause for poor educational achievement. I should like to know, has there been within recent years a marked increase in the number of children who are unable to read? And I should like also to know, Dr. Insight, what is your opinion regarding the nature and the cause for reading disabilities?

Dr. Insight:

I sincerely wish that I might answer your questions more adequately, but they are points which more properly belong to a specialist in education or psychology. In those fields I can pass only as a layman. However, there are some general points which have bearing upon the questions and about which I happen to know. We are celebrating this year the five-

hundredth anniversary of the invention of movable type. That invention made feasible and economical the duplicating of books in large quantities. Consequently, with the development of printing and with corresponding development of a number of social and industrial factors, books and magazines have been made available in large numbers. Hence, schools have placed more of their instructional procedures upon the reading of books and extra-school activities have likewise accentuated a similar demand. Naturally, when a trait or a procedure is greatly demanded, deficiency with it becomes more apparent and perhaps more real. I have no way of knowing actually what the condition is within the schools, but this matter of extra demand is certainly a factor in it.

Mr. Aiken:

That sounds like a reasonable point, but secondary school teachers are of the opinion that an increasing number of the students who come to them are unable to read the assigned materials. We are wondering whether the deficiency is not due more to defective development in the elementary school period. It seems that an increase so marked as some believe has occurred can not be due merely to over-demand for reading.

Dr. Insight:

I have been interested in a mild sort of way in the condition which you describe. May I say as an outsider who is interested in education and in educators, that I am very much concerned over the internal criticism of educational procedures which we experience in associating with teacher groups. I believe you will not find comparable criticism outspoken within the ranks of the other professions. And I certainly believe that the problems which are experienced as "deficiencies with reading", so-called, are far more complex than can be explained by a mere change of instructional method in the elementary schools. The colleges are complaining in a similar manner of the high school graduates, and there is comparable criticism of the graduates of the colleges. Only a short while ago a college president published the assertion that over thirty millions of our adult citizens were unable to read efficiently. Surely, no such group exists which has not been within the range of the schools.

Mr. Smith:

There you have it! Everybody is looking for a simple explanation for any difficulty which he senses. As adults we are disappointed with the voters because they don't know enough to decide how to vote. We say, the schools ought to teach them such things. But the colleges say they can't make the students intelligent because the students can't read. The secondary schools can't get the pupils ready for college work because the elementary schools didn't do their work properly. The elementary schools can't teach them because the children are not interested, or because they can't learn to learn. Where does this all get us!

Dr. Whosit:

That is an old question of social psychology. Whenever faulty behavior is noted each institution blames one which can be held to have preceded it in blame. In this instance the colleges blame the high schools because a student cannot read. The high schools pass the blame on to the elementary schools. The elementary schools blame the homes. In the homes the mothers say, "I'm not surprised. His father's folks are all

queer. None of them shows any judgment." Naturally the father has to agree since his lack of judgment is evident, having married a woman who would make such a remark. (Laughter) It seems to me that this problem and most of the problems which our society faces are not going to be solved by passing the buck. I should say that every phase of our social institutions is in some way at fault. Don't you think we sould try to develop a more fundamental idea of the problems we are considering instead of placing so much attention upon who is to blame for them?

Dr. Insight:

I believe you have a good point there. If, for example, we knew more about the nature of the reading process, I am convinced that many of our present problems would not loom so large and so crucial as they now appear.

Miss Pleasant:

That is an interesting idea. May I ask what you conceive the reading process to be like?

Dr. Insight:

I suspect that you will find my ideas unorthodox. But when I think of a reading process I always think of an interpretation or even more than that, I think of a behavior which is governed by interpretation. However, it seems to me, that reading is most commonly thought of as a set of specialized habits. It involves memorized facts and particular ways of behaving when printed words are seen. That conception of reading is the conception which people have in mind when they demand that the schools teach pupils to read. The criticism is only partially justified because if the demand of the critics was fully and completely realized we would be worse off than we are at present.

Miss Strict:

Why do you say that? It seems to me that my work would be much simplified and many times more effective if my pupils had previously been taught to read.

Dr. Insight:

Exactly. But what specifically do you mean by the words, "taught to read"? You see, we really experience great difficulty in the act of communication, for the reason that we like meanings which we supply in common to our terms. When you think of reading, you think of an act of recognizing certain printed words and of sensing those words together in a rhythmic sequence. The student is conditioned or habituated to think of certain ideas when certain words are seen. He then becomes a tool which you can manipulate at will by arranging the sequences of occurence of his word stimuli. When I think of reading, I think of an act of intelligence in which the reader possesses a personal purpose, ability to sense the significance of the pattern of stimuli, and in which he actually makes a sensible effort to adjust his reactions accordingly. The act of reading in which printed words play such an important part is a specialized form of behavior which has to be learned. The act of reading which I have described is as native to our behavior as digestion or awareneness. With such a wide difference existing between our meanings, we can neither agree nor disagree. We must come to common understandings in order that we can communicate our ideas.

Miss Wright:
But would you call behavior reading if people were reacting to situations wherein there are no printed word symbols?
Dr. Insight:
Certainly I would. Word symbols are not ideas; they are mere symbols for representing ideas. Words are maps of routes through which ideas may be assembled, but the ideas are not there any more than an accident is actually where the spot X on the map indicates that it took place. Now, if interpreting symbols is reading, and it is, I can see no logical reason for thinking that interpreting things, relationships, and such, is not also reading. Why should we be more concerned about mechanisms for re-presenting ideas than we are concerned about the actual development or creation of the ideas in the first place?
Mr. Block:
Then, do I understand correctly, that you would call reading the acts of interpreting pictures, diagrams, and even objects such as people, clouds, or any of the patterns of nature?
Dr. Insight:
Such behavior has been called reading since we possessed such a term. Did you ever have your fortune read? If so, did the reader read tea leaves, playing cards, or the markings on the palms of your hands? You see we commonly speak of reading in that connection. Goldsmith made clear to us that school children read their teachers to foretell the probable events of the day. We speak of reading maps, so we certainly read the things which the maps represent. We speak of reading barometers, thermometers, and all sorts of instruments for measuring. And finally, we speak of reading people, for there is a citation in the dictionary which states, "and you who men's fortunes in their faces read". Now that we find that the term 'reading' is often applied to acts other than those which involve printed words, I would like to ask why we should not have expected such to be the case? What is there about reading printed words which justifies its being set apart as an isolated phenomenon?
Miss Strict:
Well, even if we accept and agree with what you have said, it is still necessary to teach people to read. My problem is, what shall I do with people who have not learned to read mathematical material?
Dr. Insight:
I suspect we shall have difficulty with the meaning of your term "mathematical material". By mathematical material you probably refer to the printed symbols used to express ideas about quantities and quantitative relationships. However, we must not fail to recognize that the quantities in the concrete and observable relationships are a more basic type of mathematical material. I believe that you will find a considerable astuteness among people for reading the concrete forms of mathematical material. Difficulty frequently enters when such material is not present but symbols are used to represent it. The difficulty then is ability with communication even more than with the primary ability to read. Have your pupils learned the vocabulary meanings for the mathematical language processes? There is much similarity but also great differences among our

several forms of language techniques. Have those been disclosed to the pupils?

Supt. Jones:

Those are good points, but I should like to ask when you think the school should begin the instructing in reading procedures.

Dr. Insight:

I am afraid my reply will be most unorthodox, but I shall have to state that the school does not begin the student's reading activities. They begin long before he ever came to school. The school doesn't begin anything which is particularly unique. It merely stimulates, facilitates, and directs the refinement of process of behavior which began before the child entered school. Perhaps it would be more proper to say that all learning emerges from basic native behavior reactions which are inherent with conscious living. Consequently, attempts to identify the beginnings of learning are as futile as are attempts to identify the beginning of life. The school begins its instructional program as soon as it comes in contact with the child. However, that instructional program should continue types of learning which the child was previously engaged in. Only gradually and by degrees should one emphasis in instruction be supplanted by another.

Miss Wright:

Then I presume, that you would question the idea of maturation as producing readiness for printed-word reading.

Dr. Insight:

I scarcely know whether to say yes or no to that statement. It is well known that maturing of some type takes place in all activity. However, it is also true the developmental processes are responses to environmental demands. It seems unlikely that anyone would ever develop a desire to attempt to read printed words if there had been no experience with symbols of that nature. People frequently make marks or symbols in order to emphasize vocal statements. These are psychologcially similar to word symbols. If children are stimulated by such activities it seems clear that they will profit thereby. However, it appears to be true that very young infants are not likely to learn particular words. There seems to be an optimum condition for learning anything at any level of development. However, there is likely to be a wide variation in ability under other conditions than the optimum. I doubt very much that optimum conditions can ever really be discovered or that they can be attained if they are discovered.

Mr. Aiken:

I should like to ask you for a brief statement of your conception of the nature of the reading process. In responding to Miss Pleasant's question, you mentioned that you think of reading as interpretation. You indicated that we read many sorts of things, but I do not recall that you have clearly stated what you would class as reading and what would not be so classed.

Dr. Insight:

I think of reading as the process of making discriminative reactions to stimuli. The critical word in that expression is the word <u>discriminative</u>. It connotes purposing, sensing, evaluating, choosing, adapting, and re-

sponding in accordance with the results of those processes. There really is little fundamental difference in the process whether the stimulus be mainly sound, touch, taste, or sight. Blind people are taught to "see" words with their fingers and the deaf are taught to "hear" with their eyes. Reading is, then, a mode of living. It is living under conditions which activate one's intellect. When discriminative ability is functioning at high pitch, the reading level is high. When discrimination is low, reading is low. Habits may facilitate reading but potentially they may also prevent its occurrence. Reading is the act of creative perception. It is a process which belongs to each individual for the reason that what one perceives is largely a personal matter. Reading involves a projection of meaning to the stimulus from the reader's stock of images. If the reader does not possess pertinent meanings to project, the reading will be ill adapted to the conditions. This idea is opposed to the current one which maintains that readers extract meaning from the stimulus pattern. The extractive procedure may occur, but that which is extracted cannot come from the stimulus. It is more in the nature of a change among the images already possessed. It is a shift or reorganization of perceptions under direction of the stimulus. Consequently, the reading of word symbols, either seen or heard, presupposes that the reader is adequately supplied with meanings which he can project to the symbols involved. Therefore, the reading of word symbols must be considered as a secondary as contrasted with more primary reading procedures. Instruction in the reading act involves teaching how to perform the primary forms of reading as well as how to perform the secondary forms. It is in that respect, it seems to me, that educational procedures are most in error. They seem to be based upon the assumption that meanings reside in printed words and that the meanings can be extracted from such sources by means of procedures largely performed as habits. That conception appears to be responsible for much of what we may term "verbomania" in our behavior. A verbomaniac is one who uses words but who has little or no conception of what social agreement would make the words mean. For example, Sheridan has created a type verbomaniac in the character of Mrs. Malaprop. Her contribution to the play, "The Rivals", is her inability to use the proper words to express her ideas. She says, "You go before and I'll precede you", "He is as headstrong as an allegory on the banks of the Nile", etc. To avoid such products and in order to utilize more fully the great contributions to ideas which come from everyday experiencing, I suggest that we use the broader conception of the reading act. It is likely that we shall find that types of reading other than those associated with word symbols evidence deficiencies also. I suspect they are even more serious and critical. Good reading is good living. The human race must have read for centuries before printed books came into existence. Is it not possible and would it not be wise to permit every student to re-experience the development of the various forms of reading somewhat as they were developed by the races?

Supt. Jones:

Reading is a mode of living. It is more than a mere perusal of books; it is the process of making discriminative reactions to stimuli. That idea sets up a whole program of instruction for the schools. Every conscious

act is a reading act. Then every teacher is a teacher of reading, and good teaching will help the pupils in developing better and more discriminative ways of responding to stimuli. There is something in that for every teacher.

Miss Wright:

Then my idea that children are reading when they are playing with toys or with other children is correct. An activity program is really a reading program. We teachers must insist that our pupils understand what they are doing instead of merely drilling and memorizing facts and procedures which they do not understand.

Miss Pleasant:

Then, Dr. Insight, I have an idea you would approve the basic principles of modern elementary education. We try to make learning a mode of living and that is just what your idea of reading is. I was surprised, however, at your point that the schools do not initiate reading. However, I understand that you mean that we really build upon the development which preceded the present experience. Readiness is a condition rather than a state. There will be readiness problems at all levels and for every discriminating act. Perhaps the problem in secondary school reading which so disturbs Mr. Aiken is due largely to the neglect of the high school teachers to make their students ready for the tasks assigned to them.

Dr. Whosit:

That is a good point, Miss Pleasant. It is one thing to make an assignment and it is quite a different thing to see that the assignment is possible for the child to do. Also, Dr. Insight hit the nail on the head when he intimated that a very wide gap exists between the stock of ideas of the students and those of the textbook authors. Not only is there such a gap, but there is perhaps an even wider one between the author's idea and the student's ability to express it effectively. Immature people commonly have poor vocabularies of word forms and even poorer vocabularies of ideas. That is a place where we can all do a better job of teaching. Students need ideas and motives far more than they need drills or work books.

Miss Strict:

Well, this discussion has opened a new field for me. As Dr. Insight was speaking, I kept asking myself, "What has this to do with mathematics?" Suddenly, I realized that mathematics is a mode of living. Mathematics is a process of making discriminating adjustments to quantity. Mathematics is reading. It is something which everyone experiences. It is a way of sensing the world about us, and a way of thinking. It is a basis for our whole social organization. I am sure that I have been guilty of teaching it as a bag of tricks. Memory has meant more to me than understanding. Perhaps that's the reason my students have been having trouble. I'm going to re-read Mathematics for the Million. I think I'll like it better this time.

Mrs. Gettsit:

I was interested in the idea that social and personal maladjustments are really forms of reading disabilities. I think there is a point of importance to consider in that. When we undertake to reduce illiteracy we strike deeply into our social problems. I am still pursuing the causes

for inabilities. I think we could profit from a study of the psychology of the act of reading as Dr. Insight has described it. I wonder whether we might not do well to follow up this evening's discussion by investigating what psychology can tell us concerning it.

Mr. Block:

I like that idea. From what I have just heard I seem to be getting the idea that learning to read is a life-long process, and to the development of reading each level of the school system should make its contribution. I'm beginning to feel also that those of us who teach the more advanced students may be putting undue emphasis upon one phase of reading and thereby handicapping students who find that type of reading difficult. Perhaps that is why students may excel in one type of school work and suffer difficulty in another.

Miss Olds:

As Dr. Insight was speaking I found myself wondering just what we mean by English. Should we not be more clear as to what it means? And is not the study of communication, that is, language, a basic social concern? I'd like to have such points considered.

Supt. Jones:

These are excellent comments. I feel certain that the problems which have been raised are going to lead us into better relations with the work of the school. The conception that <u>discriminative</u> behavior is fundamental to learning is of great value to us. The idea that reading is a mode of living, that reading is basic. Bringing out that reading is more than the perusal of books, and that there are many types of reading performance, just as there are many kinds of things to be read, has been helpful. Dr. Insight, I wish personally to thank you and to extend the thanks of this council for your valuable assistance in clearing up some of these points. The hour is late and I suspect that we should adjourn. However, we shall meet again soon to continue this discussion.

FINAL CURTAIN.

THE END

READING PROPAGANDA

Russell M. Story, President, Claremont Colleges

The nature of propaganda is both psychological and sociological. On the psychological side propaganda is an attempt to influence the desire of the one to whom appeal is made. In order to do this the range of propaganda spans from appeals to bias and prejudice, on the one hand, to group and crowd effects on the other. Bias and prejudice give opportunity to take advantage of the ignorance and passions of the one to whom appeal is made. The crowd exists and is influential either in terms of a real physical grouping or an imaginal grouping of those with whom the individual is either identified in his own thinking or would like to be identified. Few people are able to escape identification with both types of crowds.

On the sociological side propaganda is identified wherever possible with the prevailing mores of the group; social, economic, religious, or national, and with the institutions such as Church or State in which the prevailing group-patterns of relationship and adjustment are embodied. So far as appeal is made through language, either written or oral, or through visual means, symbols are employed to evoke the attachments and loyalties which center around particular groups of mores and institutions. When these mores and institutions are no longer effective adjustments in group life, substitutes for them emerge as centers with respect to which the individual can develop similar sentiments and loyalty and which will evoke the same types of group response and action.

Propaganda in the sense in which we have used it here is therefore cast in appeal to these psychological and sociological elements and is clothed in such rational mold as can be devised with a view to establishing its acceptability and the illusion of general agreement. Reading is therefore a problem first of the individual's knowledge of himself, and second of the measure of this objectivity with respect to the crowds, real and imaginary, with which he identifies himself. The knowledge of oneself involves a good deal of good humor and invites humility. Self-respect demands respect for knowledge and truth, but our biases and our prejudices are largely compounded of our desires at work in a field of relative ignorance. Even when we must act without knowing, we later tend to select those evidences of result which justify and validate our actions. This is true even though in so doing we have to subordinate other data and logic, and pervert the reasoning process which might lead to a rational evaluation or decision. It is fair enough to admit that we must make decisions, but we need not love them. They ought always to be subject to change without notice and without violence to our self-regard if further evidence warrants the revision.

In so far as reading is a problem of recognizing the "crowd", real and imaginal, with which we identify ourselves, it is important that we be aware of our tendency to identify ourselves thus with crowd responses.

Story 2

Most men crave the illusion that their feelings and their behavior in thought and action are supported and sustained by their fellowmen, and, if possible, by most of their fellowmen. Thus while there is no integrity in the label "Republican" or "Democrat", most partisans cultivate the illusion of such integrity and project to their fellow-partisans the same motives, sentiments, and reasoning which they recognize in themselves. It is the knowledge of such phenomena which will give to the reading individual a relative immunity from the more gross appeals of propaganda and develop the antibodies which permit analysis to occur and give reason a chance to support self-respect.

In so far, therefore, as reading is a matter of word symbols and the term is employed in the usual and narrower sense of that word, it seems to me to be extremely important to have as one of the results of education and perhaps as the first objective of education this knowledge of oneself. Only by so doing can one be deemed responsible for the content of his abstractions, bring critical judgment to bear upon such content and his own behavior in the face of propaganda, and be helpful to his fellows who are subject to the same stimuli. Reading may become a powerful solvent for those errors and illusions which stand in the way of keeping man's human and social relationships and his institutions abreast of the changing environment which his own genius creates and which his relative mastery of nature controls. In the absence of such adjustment, more or less rationally designed and supported, one can see man making his way into the future on the assumption that past adjustments are sufficient, or blindly on the basis of trial and error.

Reading in any formal sense cannot wholly rectify this condition, but it can do a great deal. It can equip the individual with the kind of knowledge which supports a self-respect that never permits him to compromise himself, even though he must live in a world of compromise.

PERSONALITY CHANGES IN ENDOCRINE DISORDERS

Benjamin N. Tager, M.D.
The Shelton Clinic, University of Southern California, School of Medicine

Much real progress has been made in the study of endocrine disease during the past ten years. The subject has been greatly emphasized, probably disproportionately so, resulting in a form of glandular self-consciousness, which attributes to itself a great host of physical and mental ills. Part of this is justifiable, a much greater portion imagined. Too frequently chronic medical complaints difficult of solution are assumed to be endocrine. Even more frequently, chronic mental woes, problems in personality behavior ranging from acute forms of insanity to the harmless thumb-sucking are hopefully laid at the doorstep of endocrinology. In an attempt to clarify this issue, the subject of personality, as affected by endocrine disease, will be presented here.

Since the subject of personality is in itself more involved than that of endocrinology, a discussion of the relationship of the two is as of between the devil and the deep. Personality may be defined as a resultant of internal forces within an individual affecting his relationship to the environment. It may be regarded as a subjective concept and may be subdivided into such components as impulse, temperament, character and intelligence, terms in themselves self-explicable. It is a form of potential energy, a summation of attributes that could be brought to bear in our dealings with the world. When it is expressed or becomes kinetic, one may designate it as behavior, an objective concept.

To assign the proper value to the endocrines in the production of a personality change, an understanding of three fundamental types of mechanisms involved in any disease-personality relationship is necessary. These are the organic, the functional and the psychogenic.

The Organic Mechanism

The organic mechanism rests in the structural status of the body. The most fundamental is the constitution of an individual or a resultant of hereditary factors expressing themselves in certain body types (example pyknic or leptosomic) with predisposition toward one or another form of personality or mental disease (manic-depressive or schizophrenic). Various other classifications of constitutional types have been evolved. A simple and safe makeshift rule is the careful consideration of hereditary trends. An intercurrent disease of any nature with its consequent personality alterations must be invariably considered in the face of the constitutional ground swell affecting personality from birth and continuing long after the last ripple of the disease interlude has passed. Disease will not affect the underlying constitution. To the contrary, there are good reasons to believe that certain types of constitutions will predispose us to certain diseases. A woman who has been placid all her life is less

liable to suffer from menopausal symptoms than one who has been habitually "nervous". Under ovarian therapy the menopausal symptoms in the latter may be markedly alleviated but she will not be converted to a placid individual. A residual of considerable nervousness comparable to what had been present all her life will remain.

Another type of an organic or structural mechanism is found in the congenital anomalies -- or defects originating in the germ plasm or intrauterine existence. Anomalies in brain development and cerebral aplasias fit into this category. They may cause very profound personality abnormalities which are practically irremediable. Diseases such as mongolism, Laurence-Moon-Biedl syndrome, are examples of this type. A third type of an organic mechanism altering the personality is represented by the pathological changes in the brain such as produced by hemorrhage, infections, and brain tumors. Endocrine manifestations are often concomitantly present with these organic factors, because of the continuity of the pathological process in the brain eventually involving the pituitary and the hypothalamic centers, or because (as is often in congenital anomalies) they are multiple and involve the endocrines coincidentally.

2. The Functional Mechanism

The second type of mechanism producing personality alterations is functional, also called symptomatic. Due to an altered biochemical or autonomic nervous activity in the body, it is most often reversible. For this reason, its recognition holds considerable promise for the patient. The toxic psychosis from disease, drugs and alcholism are here represented. Alterations in the female psyche with menarche, menstruation, pregnancy, and menopause are similar examples. A very frequent functional mechanism affecting personality reactions is hypoglycemia. In this condition there occurs a depression of a blood sugar level sufficient to interfere with the normal functions of the nervous system leading a variety of distressing symptoms such as apprehension, feeling of insecurity, clouding of consciousness, loss of attention, asphasia, irritability, and fatigue. In other words, the higher cortical functions may be temporarily disturbed leading to abnormalities in impulse, temperament, character, and intelligence. In addition, disturbing neurological signs may appear ranging in their mild forms in association with the mental changes of diplopia, sweating, and tremor, to the more rare and severe types with convulsions and coma. In the latter cases, a pronounced fall in the blood sugar to subnormal levels is demonstrable usually due to a hypersecretion of insulin from the uncommon adenoma of the pancreas. In the mild forms which are extremely common and occurring in many metabolic and endocrine disturbances, in fact, often in the absence of any known disease process, the blood sugar may be moderately or not at all depressed. The phenomenon depends on the concomitance of such other factors as the adequacy or cerebral circulation and oxygenation, extent of adrenalin response, etc. All hypoglycemic reactions, however, have one thing in common. They are reversible following the ingestion of carbohydrate food and often preventable through dietary regulations, particularly when mild and characterized primarily by the personality changes. The following examples will demonstrate this point.

A nurse, age 23, became apprehensive, tremulous, and confused during her ward work at 11 a.m. Sedatives interfered with her work even more. The problem continued for six months, led to distress and worry and a consideration of changing her occupation. She was in the habit of eating a high carbohydrate, low protein breakfast at 7 a.m. Regulation of her diet to augment the protein intake at breakfast with a small carbohydrate supplementation at 10 a.m. controlled her symptoms and prevented these attacks. A girl, age 12, experienced confusional states followed by fainting on Sundays only when in church, usually occurring before noon. She was accused of malignering and dealt with severely by her parents. Breakfast on these days was unusually light and very early. The attacks, however, continued until the proper dietary steps were taken. A physician's daughter, age 16, was brought in with a diagnosis of possibility of pituitary tumor because of visual complaints during her French class at 11 a.m. Several times a week she would be returned home, asphasic, put to bed without food (because of nausea and headache, a frequent hypoglycemic symptom) until suppertime when following tea and toast she would improve. It was noted that these attacks never recurred on Sundary when school was out, the patient eating a more solid breakfast later on this day. "Gym" usually came before her French class and coincided with days of attacks. It is obvious that added exercise exhausting the sugar more rapidly was the straw that broke the camel's back. As is so frequent, the episodes were aggravated during a week preceding the onset of menstruation. All symptoms were promptly and completely cured with proper dietary regulations. A dentist, age 36, developed a habit of avoiding difficult work between the hours of 10 a.m. and noon because he found it to be of an inferior quality and frequently had to be repeated. He consulted several doctors and a psychiatrist. He abandoned smoking and relinquished some evening social activities to no avail. Here again dietary regulation solved the problem completely. Relatively simple cases uncomplicated by any disease have been presented. The blood sugars as obtained were within normal limits or at best only moderately depressed. All gave a predisposing type of a dietary history which may be considered normal for a good many other individuals. All were cured by a few very simple regulations. These cases have been multiplied a hundred fold. It is quite understandable how when uncorrected they may lead to distressing emotional and mental changes and interfere with work. The issue deserves far greater attention in schools and colleges where food habits are hurried and inadequate, hours are long, and emotional and mental tension runs high. It has been demonstrated that workers' output in the factory may be increased by the dietary regulations aimed at prevention of the hypoglycemic manifestations sapping efficiency. It remains to be demonstrated that intellectual work in schools may be made more comfortable and augmented by this means.

The Psychogenic Mechanism

The third fundamental mechanism of personality aberration is the psychogenic. In all cases it is due to an awareness of a problem, be it external (environmental) or internal, such as the recognition of disease or bodily abnormality (somatopsychic). Every disease is followed by some psychogenic reaction. The personality disturbance may be superficial and

easily overcome by the correction of the situation produced. It may become more deep-seated into a pattern reaction or the personality habit, that persists after the exciting cause is withdrawn. It may become intense enough to completely obscure and over-shadow the precipitating cause and develop into a mental disease.

Since visible bodily aberrations of which the patient is aware are common in endocrine conditions, one might expect pronounced somatopsychic complaints. Such is indeed the case. The problems raised by obesity demonstrate this well. We are well familiar with the many appellations tagged on corpulent youngsters. Outside of the physical difficulties, they are in a constant somatopsychic stress. The problem may be handled by the obese individual, in different ways, depending on the original status of the personality, constitutional factors, etc. In any case, a distortion of personality occurs in an effort to handle the situation. One child may become extremely retiring and anti-social and the next one will compensate into a "smart alec" of the class. Intelligence is not affected, but impulse, temperament, and characters are. A somatopsychic mechanism of this type working over a period of years, produces certain personality habits or patterns which persist long after the original cause, the obesity, may have been removed. The dangers of undesirable and fixed pattern reactions point to the need of early correction. In an adult unmarried female, the somatopsychic manifestations are often pronounced, while in the married obese, they are not. The implication is obvious. Although the obese marriagible female may become a "smart alec" and the life of a party going to extremes, more often than not she is subdued and avoids a great many of the social pleasures. Having lived sufficiently long in a world amply provided with all kinds of disease, she develops a multiplicity of pains and aches, concerns over her heart, etc. An interesting reaction not uncommon in individuals aware of their dietary restrictions is the feeling of nausea produced by the intake of food, high in calories. We have seen the development of gastric symptoms with vomiting and dehydration pronounced enough to cause hospitalization in a few extreme instances. The patient is not always to blame for this state of affairs. Obesity is often medically mistreated, leading to a hopeless defeatism in the patient. A psychological transformation occurs in the female, who discovers that she can lose weight comfortably and steadily, pointing eventually to a figure for which she does not have to apologize. The various pains and aches disappear as promptly. Outside of obesity there are other interesting forms of somatopsychic behavior as for example, in hypogenitalism, hirsutism, and disturbances in growth. They will be briefly mentioned in case presentations. One must not overlook that portion of the psychogenic mechanism caused by the environmental. It usually consists of a long standing psychological problem of which the patient may or may not have been aware. The victim of his unsolved problems may not show any evidence of stress until some critical time in his health precipitates acute manifestations. For example, a woman at the time of menopause and complaining of many of the usual symptoms referable to this condition, turns to alcoholic excesses to the consternation of her highly respectable family. It would be an easy matter to explain the situation in terms of menopause.

Such, however, is not entirely the case. She had been intensely unhappy most of her life with a thoroughly incompatible husband, and the menopause represented an added physiological stress that made it difficult for her to handle the problem further. Furthermore, it was a psychological turning point in her life that forced her to take stock of her whole life. Proper ovarian therapy controlled the symptoms of menopause but did not control the drinking. A common sense psychotherapeutic attempt explaining to the patient the mechanism of the situation did the rest.

This completes the triad of mechanisms, organic, functional, and psychogenic, operating to produce personality changes. They may operate singly or more often in combination. Every medical case, and particularly an endocrine case, presents problems in personality often voluntarily expressed by the patient almost in the same breath with the medical story and can almost invariably be elicited on questioning by the physician. The personality problem may be only a small thorn or become a major issue, obscuring the whole picture. Following a clarification of the medical aspects, it is essential to visualize the personality behavior problems in the light of the medical information obtained. One or two pills do not solve the whole problem, nor does a blanket psychological formula belonging to some popular school of thought. A point of view broad enough to include the three concepts of the organic functional and psychogenic has been very helpful in the understanding and treatment of any given case.

ADMINISTRATIVE ASPECTS OF THE READING PROBLEM IN JUNIOR HIGH SCHOOL

Harold B. Walker, Principal, Junior High School, Riverside

I suppose that to the really good administrator the administrative aspects of any problem are very simple: just find the right person to do the work and the problem is solved. Certainly, as far as the reading problem is concerned, the solution should be easy; we should assume that any one of the teachers who have the training required nowadays is capable of solving this problem. And so, all the good administrator has to do is call his teachers together and say, "It appears that here is a problem. Let's solve it." And straightforth all the teachers would set about seeing that the reading problem is solved.

Unfortunately, to some of us average - we hope - individuals who have administrative or teaching responsibilities, the reading problem is a little more complicated than just indicated. We take the learning to read as a matter of course in the early grades, although there are many difficulties at that stage. But when we assume that the reading facility has been developed, we begin to realize that we have some reading problems on our hands. As other speakers have mentioned, various difficulties become apparent in which failure to read may be either a cause or an effect, possibly some of each. Retardation in school, evasion of reading tasks, cheating, simulated laziness, and other unsocial behavior are easily noticed. Demands on administrative time steadily increase with the advancement of the pupils through the grades. The cost of repeaters has often been computed, but the cost of extra time required and loss of efficiency in keeping a pupil "up with his grade" and "socially adjusted" is as evident and, in these days of promotion on the basis of "social maturity", is as great, possibly even greater. It then becomes the duty of the school administrator to reduce to a minimum the loss due to reading difficulties not only in order to save the actual cost of education, but to improve the mental and social equipment of the pupil which may have far-reaching effects in vocational, avocational, and social adjustments of future citizens.

Briefly, let us outline the task of the administrator. We may say there are four main duties, as in most problems: first, discover the need; second, devise a plan; third, secure support; fourth, put the plan into effect. Testing for results and revision of the plan should take place at intervals to make sure that the utmost progress is being made. As a matter of good salesmanship, it is also good practice to let the authorizing group or supporting agency know, through information about the results, that the plan is succeeding, being changed, or abandoned.

The first step is perhaps the easiest, contrary to most situations. Ignorance of the condition is seldom the cause for doing nothing about removing reading difficulties. In these days, most schools have testing materials if the results are not already available. Other evidences of difficulty have been set forth by other speakers at this conference. May we be pardoned for a personal reference at this and possibly a few other points? We have been fortunate in having test records available for all

seventh grades coming in from our city schools. These records show mental age, chronological age, and various subject ages on standardized tests at the end of the sixth grade. Similar tests are given to all new pupils suspected of academic deficiency and to the others as soon as it is convenient. From these records, retardation can be noticed easily. If the mental age and reading age are both low, the test of mental ability is checked for influence of reading ability, since the group tests used depend largely upon reading. If it appears that the low mental age is due to reading disability or language handicap, a Binet test is given to approximate more closely the true mental age. If it then appears that the reading age is a year or more below the mental age, the pupil is marked as eligible for remedial reading. This difference of a year is an arbitrary amount which cannot be strongly defended except by saying it has given satisfactory results.

Even so far, you can see that the first step of discovering the need has involved the second step of devising a plan. Just so, the problem of reading is like most educational problems: it cannot be divided into neat little piles and wrapped up in separate parcels, labeled precisely for future reference. Nor is the need indicated merely by the number of those below the standard set. The needs may also be measured by the amount of variation from the standard and by the type of difficulties causing substandard performance. Thus, pupils of eleven years mental age and second or third grade placement in reading present quite a different problem from those with only a year of retardation. At the same time, a child from a normal home in which English is spoken presents quite a different problem from one with an equal retardation who comes from a home in which Spanish or Japanese is the common language. Visual, audial, nutritional, glandular, nervous, and each of the many other difficulties or combinations of difficulties, all present such different problems that the need must again determine the plan.

Just as there are as many different problems as there are pupils, so are there as many different plans as there are teachers and administrators. Generally, however, in order to make things look and sound a little more orderly, we may designate a few types of plans for handling the reading problems. First, if the number is very small, if the pupils are not seriously retarded, and if one teacher having these pupils regularly in class is competent <u>and</u> interested, the problems can easily be handled incidentally in this regular class with the cooperation of the other teachers. Second, if the problems are more serious, the competent <u>and</u> interested teacher may give of spare time to help the few. Third, and this seems to be the best in fariness to both the pupil and the teacher, the program may be worked out to allow for regular time to be devoted to reading problems. Fourth, if the numbers and similarity of cases warrant it, a separate group may be formed in which all of the work may be directed along the lines of need.

It is not implied in any of these plans that the solution of the reading problem can be confined to one period, one room, or one teacher; and although this statement has been made in a hundred ways, hund-

reds of times, we must all keep reminding ourselves that reading is more of a totalitarian experience than anything going on in Europe now and just about as terrifying when you think of the possible effect not only on the individual, but on all those with whom he may come in contact. And so, in devising the plan, we must consider that phrase which is used so much nowadays, "the whole child" and his whole experience.

At the same time, we must not accept without reservation the statement that "every teacher is a teacher of reading." Certainly the statement is true, but it says nothing about the quality of the teaching. To some extent, every man is a physician, but when there is a serious impairment in his health, he goes to a trained man for help. Likewise, in the field of reading, we need the services of a trained worker. In some places, this expert is made available to a number of schools either by sending pupils to a central location for all or part of the time, or by sending the expert to various schools on a regular schedule. Either form of this fifth plan is apt to lack effectiveness because of the difficulty of coordinating and directing the pupil's whole experience.

There may also be objection to forming a separate group either within a school or drawing from several schools, because this practice tends to set off these pupils from the rest and create an unnatural and undesirable situation. Several answers can be made to this objection. One, it is unnatural and undesirable that a child should be permitted to go further with a handicap that is ever increasing; two, it is unnatural and undesirable that a child be singled out from the class for individual help constantly; three, it is unnatural and undesirable that a child be deprived of the privileges of other pupils by being "kept in" for extra help which is needed often because of no fault of the child. The one constructive answer which can be made is to grant the unnaturalness and undesirability of the situation and elicit the cooperation of the school, the home, and the child himself.

Here are a few things that can be done along this line. After the list of pupils eligible for the remedial reading work has been made up, the parents should be called into consultation. The case may be presented frankly as any disability which can be removed should be presented. If the selection has been made on the basis of retardation under mental age, almost all of the candidates will be of normal or better mental ability. Thus, the often fancied, and sometimes real, stigma of lack of intelligence or of association with people who lack intelligence is usually removed at the outset. The idea that a special opportunity for advancement is being offered is usually a cogent argument. Parents must be reassured that there will be no discrimination against their children either by the teachers or the other pupils. Furthermore, this point must be carefully carried into effect.

So far, the pupil has not been consulted; and yet he must be. A factor of prime importance to success is that of readiness. No matter what the teachers and parents may think, the pupil will not succeed if he does not approach the work with an awareness of the difficulty, a desire to improve

a confidence in the teacher, and a belief that this is just about the best way to accomplish results. All of this attitude may not be created immediately, but at least the pupil must feel that membership in a remedial group is a privilege, an opportunity, and not a penalty. Often good results are obtained by conference with the child first, sometimes it is convenient to talk with parents and child together. In only a few cases is it necessary to leave the child out of conference until last. No one rule can be laid down for all cases. In any event, a child will probably do as well in a regular group as in a special group if he is forced into the latter.

Now here we have proceeded through the plan, touched upon obtaining support -- for support must come from both pupils and parents, as well as the administration and general public, -- and are approaching the point of putting the plan into effect. Among other things, we have omitted several points concerning the plan. You have probably gathered that we have favored forming a special group if numbers warrant it. We have done this for various reasons: concentration of the work in the hands of a well-trained teacher, better use of the teacher's time, better use of special materials and equipment, better integration of the pupil's work, and the opportunity to build up an <u>esprit de corps</u>, a pride in the work being done.

We have mentioned obtaining the support of pupils and parents. It is also necessary to be sure that the program has the support of the faculty and student body, otherwise the harm caused by antagonistic conduct, disparaging remarks, or mere lack of cooperation may more than offset any gain made in the class work. While it is fairly easy to obtain the support of the faculty, it is somewhat more difficult to establish a desirable attitude on the part of all members of the student body. We must be careful to avoid the appearance of punishing pupils because they are "dumb", and at the same time we cannot appear to be granting special privileges to any group. A single adverse criticism may start unfavorable mass opinion which will nullify all benefits and, conversely, a sympathetic cooperative attitude on the part of fellow students may increase the benefits immeasurably.

In some places it may be necessary for interested teachers to seek the support of principals, although it has been assumed so far that the administrator is the chief supporter of the movement to reduce reading difficulties. If there should be a lack of support when the need seems imperative, about the only advice that can be given is to present the problem fairly and frankly first; then if support is withheld, try the old flattery gag - "the principal is the only one who can solve this important problem." If these and other diplomatic means fail to gain support, the last resort might be to "let conscience be your guide," for the matter of the success of the children in life as well as in school may be at stake. Please do not interpret this statement as counseling rebellion.

Likewise, it may be necessary to obtain the support of a superintendent or supervisor before any extended program is initiated. A similar procedure of presentation of the problem with some demonstration of the

proposed work on a small scale should be effective. If the superintendent feels that the board or the general public should be convinced of the desirability of allotting more time or money to the reading program, the administrative staff should be prepared to present the facts fairly and impartially. If support is still withheld, there is usually some part of the work that can be carried on within the means at hand and that will demonstrate the desirability of expanding the work to meet the needs fully. The usual channels of publicity are useful if used wisely; the P.T.A., service clubs, social groups, church groups, school programs, newspapers, and, best of all, pupils and parents who are convinced of the need and value of a program of reading improvement.

We have already put some of the plan into effect, but we must be sure that we have a good teacher. But that is one thing that I cannot tell you how to do except through trial and error. The first requisite is the old bromide about choosing a teacher of children rather than a teacher of a subject. And yet, some of the oldest prescriptions are considered good today, although some refinements are desirable also. The teacher must have a thorough knowledge of the tests necessary to determine the difficulties, and the ability to administer the tests within the teacher's province. He must have the ability to obtain the cooperation of parents and testing and treating agencies, as doctors, nurses, and clinics. He must have a mastery of various techniques of teaching children to read so as to adapt the methods to the various cases. He must have a capacity for detail and for record keeping so as to measure the progress made and form plans accordingly. He must have infinite patience and faith and hope and charity, for progress will be slow, sometimes vanishing to the point of retrogression, discouragement will be great, and many mistakes will have to be forgiven. If such a person can be found, I for one would like to see him.

Well, now the need has been discovered, the plan has been devised, the support has been obtained, the teacher has been chosen, the pupils have been selected, the plan is ready to operate. Here we get into the details of various methods of diagnosis and treatment that are so well covered by experts in the special fields. We shall limit the remarks here to observations from an administrative point of view.

First, work to discover and treat reading difficulties as early as possible. Second, do not expect immediate results. The first few weeks may have to be spent in building morale, bolstering courage to tackle a task which may have been annoying, disagreeable, or downright detested for several years. The small spark of hope which led the pupil to attempt this work must be kept glowing until the fire of enthusiasm will keep itself going. Third, when results do begin to appear, look for a regression. Fourth, be ready to alter plans, but do not change until the first one has been given a fair trial. Fifth, show the pupil his progress, praise is still a good stimulant. Sixth, inform the parents of progress, avoid grades in special work, reports should indicate definite progress or explanation of difficulties. Seventh, seek conferences with parents. Eighth, follow up treatment to be given elsewhere, as medical or surgical care.

proposed work on a small scale should be effective. If the superintendent feels that the board or the general public should be convinced of the desirability of allotting more time or money to the reading program, the administrative staff should be prepared to present the facts fairly and impartially. If support is still withheld, there is usually some part of the work that can be carried on within the means at hand and that will demonstrate the desirability of expanding the work to meet the needs fully. The usual channels of publicity are useful if used wisely; the P.T.A., service clubs, social groups, church groups, school programs, newspapers, and, best of all, pupils and parents who are convinced of the need and value of a program of reading improvement.

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Ninth, keep the pupil's work as nearly normal as possible within the limits of his reading difficulty. Tenth, return the pupil to his regular class work as soon as consistent with his progress in reading and his own desires.

All of the consideration so far has been given to the retarded reader The normal and advanced readers probably do not need so much attention,. but should not be neglected. Provision should be made for motivation of reading to capacity; materials which are of such a level as to be both interesting and stimulating to even the best readers should be at hand in all classes. One development which is being tried out more in recent years is the general language course. This is not the original survey course composed of several weeks devoted to the study of each of several foreign languages, but rather an elementary course in language development with only half as much text book space devoted to sampling of several languages. Such a course should prove valuable to pupils of superior ability in the language arts field. Further opportunities in speech arts, public speaking, and dramatics also open new fields for normal and advanced readers. Perhaps the widest field for these people is the many-named practice of encouraging pupils to carry on individual or group inquiry into and reports on any chosen topic. It does not matter whether you call this project, notebook, report, the same opportunity is offered. But whatever program we may develop,let us not neglect one individual for any other. Let us provide a real equality of opportunity as far as each person's ability will permit.

THE NUTRITIONAL ASPECTS OF THE READING PROCESS

Michael J. Walsh, M. Sc., F.I.C., A.I.Ch.E.
Nutrition Consultant, San Diego

The fact that we are discussing such a subject as the Nutritional Aspects of the Reading Process is a welcome indication that educators are beginning to realize that the old concept of the duality of mind and body is no longer tenable and must be replaced by the newer concept that intellect, emotions, mind, and body are not divided into separate compartments but are inter-related. According to the new concepts the body-mind organism functions as a whole, is affected as a whole, and must be studied as a whole.

The mind is not a static metaphysical unreality but a dynamic psycho-physiological integration of neural abstractions of objects and events. While in the past our knowledge of this concept has been based largely upon subjective data, the work on conditioned reflexes by Pavlov and his associates has opened the way to supplying objective evidence in support of the new psycho-physiological concept in which the discriminating faculties depend for their reporting and recording efficiency on a neural mechanism consisting of visual, auditory, olfactory, cutaneous, and motor analysers and receptors.

If this new concept is accepted, then it behoves every educator to acquire a psycho-physiological background so that he may have an intelligent appreciation of the impact and the relationship of nutrition and physiology to the mental processes. This incidentally is only of a much broader implication, namely, that educators, if they are to educate, i.e. make their contribution to the adjustment of ever changing man to his ever changing environment --must renounce their present inadequate system of pedagogics and adopt in its place the methodology of General Semantics.

My contribution is to discuss the nutritional aspects of the reading process. I understand I can place the widest possible interpretation on reading to include the process of making discriminative reactions to stimuli.

I shall begin by explaining what I mean by the term "Nutrition". "Nutrition is the sum of all the processes by which the body is nourished and maintained in the state of well-being which it was intended to maintain by nature. The science of nutrition, therefore, deals with the properties and functions of foods, air, and water which are the source materials of the substances from which the tissues of the body are built. It deals with the ways and means whereby these foods are digested, assimulated, metabolized, and converted into tissue, transferred into energy for the performance of the work of the body, manufactured into hormones which regulate the speed, efficiency of performance, and co-ordination of body function. It deals with the disposal of waste products through the lungs, skin, kidneys, and colon. Hence, nutrition calls not only for a knowledge

of foods and their functions, it also calls for a knowledge of our requirement of these foods. It calls for a knowlege of what happens to these foodstuffs in the body, and a knowledge of how the body reacts to foods under both normal and abnormal circumstances."

The essence of my thesis thus becomes a report on the relationship of food intake and the effects of food on the physiology of the organism and, in turn, its influence on the mental processes.

My method of approach will be to outline briefly the bodily functions of the various nutrients and to point out the psycho-physiological implications behind dietary deficiencies, disturbances of nutrition and metabolism.

First, a word about the body:

"The organism which we call the living human body is a most complicated intricate machine comprising billions of cells of diverse types, the coordinated and synchronised functioning of which makes life possible. By means of impulses carried by nerves from every part of the body to a central nervous system we receive sensations of light, sound, taste, touch, temperature, pressure, and pain.

"These sensations rise to consciousness only in the highest part of the central nervous system -- the cerebral hemispheres of the brain. In this cerebrum it is estimated that there are no fewer than 14,000 million distinct units of structure. Yet the various parts are so closely bound together that all work harmoniously to control the rest of the nervous system and to produce, as their final achievement, the thinking and knowing personality which is our conscious self.

"Passing out from the nervous centers, other thousands of nerves radiate over hundreds of pathways. They carry repeated volleys of impulses to some two billion muscle fibers, grouped in no less than two hundred separate and distinct muscles, and to a myriad of glands, large and small, scattered through many organs. Controlled by these nerve impulses, the movements of large muscle groups are smoothly executed. Each muscle is caused to contract at just the right time, and properly moves the 200 bones of the skeleton so that a great variety of bodily movements becomes possible. In similar fashion, glands are caused to manufacture special chemical substances of many sorts, pouring them out through ducts into mouth, stomach, and intestines, or sending them directly into the blood stream.

"The blood itself contains dozens of essential ingredients, and carries water, minerals, food and oxygen to every tissue. It is continually circulated by a central pump, the heart, a rhythmically contracting hollow muscle. This organ pumps some seven quarts of blood containing no less than thirty million million red, and thirty

thousand million white blood corpuscles at such a rate that, although distributed through more than a thousand miles of large and small tubes, penetrating the remotest recesses of every tissue, the blood nevertheless all returns to the heart within a minute and, in the same minute, also passes through the lungs. Here, spread thin with another intricate network of tiny vessels, the blood comes close to the air contained within millions of small sacs, where it gives up the gaseous wastes gathered from the tissues and loads its red corpuscles with a new cargo of oxygen."

Such is the human body which most of us take for granted without comprehending that a continuous source of supply of energy is needed for all the life processes, that raw material must be supplied for the constant manufacture and repair of tissue, for all the mysterious chemicals such as hormones, enzymes, etc. which the body itself manufactures for the maintenance of the operating efficiency of the organism as a whole.

The source of all the raw materials for the manufacture of every tissue, etc., for the continuous operation of the body mechanism is food, air, and water. Hence, a consideration of food intake and the effect of food is important.

According to the present state of our knowledge, our food should supply for the daily needs of the body groups of nutrients divided into the following classes: Proteins, Carbohydrates, Fats, Minerals, and Vitamins.

Proteins

Proteins have at least four fundamental functions:

1. The primary function of proteins is to serve as raw material for the manufacture of the living tissues of the organism.

2. They serve as raw material for the manufacture of enzymes -- the agents which regulate the chemical reactions of the body.

3. They serve as raw material for the manufacture of the hormones, or secretions of the endocrine glands.

4. They serve as sources of energy.

No tissues can be built up without proteins. Proteins must be present to repair the wasted tissues and to build up new ones. All the hormones of which we have knowledge are complex proteins, and of course, the proteins must be supplied for their manufacture.

Fats

Fats have the following functions:

1. They serve as a source of energy (reserve fuel).

2. They are essential constitutents of cells.

3. They are raw material for the manufacture of some of the regulators of body metabolism.

Carbohydrates

Carbohydrates have one outstanding function, namely they serve as raw material for the production of energy.

I have stressed above the importance of proteins, fats, and carbohydrates for the manufacture of tissue and the production of energy. These functions can only be accomplished if the chemical factories of the body are equipped with the necessary mechanisms and regulators. Minerals and vitamins are essential to complement proteins, fats and carbohydrates in the carrying out of these processes.

Minerals

The principal minerals which enter into the functions of the body are Calcium, Phosphorus, Iron, Copper, Iodine, Potassium, Sodium, Sulphur, Magnesium, Manganese, Zinc, together with traces of numerous other minerals.

Functions of Calcium and Phosphorus

We are accustomed to think of Calcium and Phosphorus as functioning solely as constituents of the bones and teeth. While it is true that they are essential constituents of the bone and teeth, and give rigidity to the skeletal tissues, calcium and phosphorus have other important functions. In fact, we should regard the bones and teeth primarily as reserve store houses of calcium and phosphorus to be drawn upon for emergency uses by other parts of the body.

Another important function of calcium is: (b) It is essential for nerve and muscle excitability. This means that the smooth transmission of impulses requires the presence of calcium. In terms of our present discussion this means that the efficiency with which visual, auditory, etc. impulses are transported and recorded depends on the calcium status of the body. If Calcium is supplied abundantly and is metabolized efficiently, transmission of impulses from nerve to muscle is smooth. This is the picture in a well poised, well adjusted individual. If calcium is deficient and is metabolized inefficiently, nerve impulses are transmitted in jerks rather than smoothly as typified by the nervous, irritable, jittery, or unbalanced individual.

Other important calcium functions are: (c) It is concerned with the coagulation of blood and milk. (d) It is concerned with membrane permeability which has great significance in such conditions as allergies, etc. (e) It is concerned with enzyme activation which means that it has great

significance in the efficiency of digestion.

The numerous other functions of calcium need not be mentioned here. The above will serve to stress the implications in connection with the reading process.

Phosphorus

Phosphorus has functions similar to calcium and in addition, has others on its own account, e.g. (b) Phosphorus plays an important part in the make-up of the nervous system. That is, it is an essential raw material for the manufacture of nerve tissue. (c) Phosphorus also takes an important part in the mechanism of muscular contraction. (d) It also enters into carbohydrate metabolism

Iron

The mineral Iron has a most important function. It is an essential ingredient in the formation of hemoglobin. This means that it is a vital factor in the transportation of oxygen for the respiratory function.

Copper

Copper is an essential mineral because without it Iron cannot carry out its functions.

Iodine

Iodine, although it constitutes only about 4/100,000 of the body weight is nutritionally essential. In fact there can be no life without Iodine.

Functions of Iodine. The outstanding function of Iodine is to serve as raw material along with protein and other ingredients for the manufacture of hormones of the thyroid gland, the principal one of which is thyroxin. Thyroxin is a protein compound containing 65% Iodine. The importance of Iodine can be appreciated by the following brief statement of the functions of the thyroid gland. The thyroid gland is concenred primarily with the rate at which metabolism takes place, in all parts of the body. Thyroid function is concerned with the following phases of metabolism:

1. Oxygen consumption
2. Heart
3. The skin and hair
4. The lungs
5. The gastro-intestinal tract
6. Mentality
7. Protein metabolism
8. Fat metabolism
9. Carbohydrate metabolism
10. Exchange of gases
11. Water Balance
12. Calcium and Phosphorus metabolism
13. Wounds
14. Heat regulation
15. Tissue differentiation
16. Sodium
17. Nervous system
18. Hybernation
19. Cholesterol
20. Other glands

Sodium, Potassium and other essential minerals have important functions which need not be stressed here except to state that they are essential for the operation of vital functions of the body such as to serve as raw material for the manufacture of the digestive juices and other secretions and for maintaining the acid-base equilibrium of the various tissues. This means that they are important factors in the various transportation systems of the body.

Vitamins

We hear a lot today about the vitamins. They are popularized everywhere, yet there are surprisingly few people who have a clear concept of their significance and functions. Vitamins are organic food substances which are absolutely essential for the growth of tissues and for the maintenance of their normal functions. Surprisingly small quantities are essential, yet without the intervention of these small quantities of vitamins, the proteins, fats, carbohydrates, minerals, and water which comprise the rest of our nutrients would be utterly worthless, just as the gasoline in our automobiles is utterly worthless as a source of power without the intervention of the mechanism which transforms it from a nasty smelling liquid into 60 m.p.h. performance on the high-way, or 500 m.p.h. flight through the air. We can regard vitamins as catalysts and activators with functions just as vital as the hormones of the endocrine secretions. Vitamins and hormones, however, have one point of distinction. Our bodies are not equipped with the mechanism for manufacturing vitamins. Hence, they must br consumed in the form of food. Hormones, on the other hand, are normally manufactured by the body and need not, as a rule, be ingested.

Part of the mystery surrounding the vitamins has been occasioned by the fact that we knew the functions of the vitamins before we became acquainted with them individually. Hence, for lack of suitable names they became known as Vitamins A B_1 C G D etc. Today, however, we know the chemical structure of most of the vitamins and we have actual chemical names for them. On account of the operation of conditioned reflexes the public continues to designate these vitamins as A B C G D and will probably continue to do so until we have been conditioned to use the terms, thiamin hydrochloride, riboflavin, ascorbic acid, etc. which are the true names of these vitamins, and the use of which eliminates the element of mystery from them.

The functions of the vitamins are surprisingly simple although to read of their properties in the literature and in the reviews, the public is led to believe that they are specific cures and preventives of every conceivable human condition. This misconception arises from the fact that vitamins have fundamental functions, and disturbances of these functions can have manifestations in a wide variety of symptoms. The specific and apparently miraculous vitamin properties result from the disappearance of symptoms when primary function is restored. I may say that this misconception illustrates better than anything else the need for the application

of General Semantics to medical practice. Its persistence is one of the factors retarding progress in medicine. It represents a classic illustration of word-fact confusion.

Vitamin A is an alcohol, a derivative of a yellow vegetable pigment called Carotine. The primary function of Vitamin A is to maintain the integrity of the epithelial tissue, which is the body's first line of defense. This means that Vitamin A is necessary for the proper functioning of the respiratory and urinary tracts, the skin, etc., reproduction, lactation, and for growth of the young.

One immediate implication of Vitamin A deficiency in connection with the reading process is that the reception of practically every type of stimulus through the senses, i.e., all those which reach us objectively from the world exterior to ourselves, is impaired.

Vitamin A deficiency results in poor vision, nerve degeneration, improper muscular function, low resistance to infections, etc. An abundant supply of Vitamin A is essential to maintain integrity of the skin, visual apparatus, the central nervous system, the respiratory, the gastro-intestinal, and urinary tracts.

Vitamin B_1 is now known as to be a chemical called Thiamin hydrochloride. It has one fundamental function, namely, it is concerned with cell respiration through its part in the regulation of intermediate carbohydrate metabolism in every single cell in the body. This means that it is essential for the normal functioning of every tissue in the body. It is essential for the normal functioning of brain and central nervous system. It is concerned with digestion and absorption of food. It is concerned with growth, and is, in fact, concerned with every conceivable body function.

The principal implications underlying Vitamin B_1 deficiency are: poor appetite, poor functioning of the gastro-intestinal system with poor digestion, susceptibility to ulcers, etc., constipation, a poorly functioning central nervous system with an inefficient capacity for receiving and recording impulses.

Vitamin C is now known to be a chemical called ascorbic acid. Its fundamental function is concerned with the formation of intercellular cement substances, hence, it is concerned with the integrity of endothelial tissue.

It has the same important function in supporting tissues that mortar has in cementing the bricks of a house together. This means that Vitamin C is essential in the development of bones and teeth and for the maintenance of the blood vessels in their proper positions with respect to the other tissues.

Vitamin D is essential for the absorption into the blood stream of

the calcium provided by the diet. This means that calcium is not available for use without the intervention of Vitamin D.

Vitamin E is essential for growth after sexual maturity, and is concerned with the maintenance of fertility.

Vitamin B_2 or G is now known to be a chemical called riboflavin. It is concerned,(like Vitamin B_1) in cell respiration. This means that it is essential for the proper functioning of the skin, visual apparatus, the gastro-intestinal tracts, and central nervous system.

Vitamin K is essential in the coagulation of the blood, hence, is vitally concerned with prevention of hemorrhages.

There are other vitamins which will probably be found to be essential for human nutrition.

Endocrines

Since the endocrine glands, thyroid, pituitary, gonads, etc.,depend for their manufacture and operation on a continuous supply of nutrients such as proteins, fats, carbohydrates, minerals, and vitamins, the relationship of the endocrine glands to the mental processes lies sufficiently within the scope of a nutritional discussion like the present one to warrant at least a brief review of the present status of our knowledge of the subject.

The following is a brief summary of endocrine disturbances in so far as they relate to mental conditions.

In Hyperthyroidism there may be

a. Mental acuity
b. Insomnia
c. Headache as manifestation of restless overactivity
d. Increased reflex activity
e. Hyperacuity of sense perception.

In Hypothyroidism there may be

a. Rapid changes of mood from depression to mania
b. Mental deficiency and apathy extremely common
c. Delay in formation of conditioned reflexes
d. Impairment of senses, particularly smell and hearing
e. Slow, unintelligible speech.

In Hyperpituitarism there may be

a. Increased mental capacity with apathy and forgetfulness following after pituitary exhaustion.

b. Exaggeration of reflexes

In Hypopituitarism there may be

a. Mental deficiency

In Hypergonadism there may be

a. Mental precocity in early stages, followed by mental retardation.
b. Easily excited and choleric
c. Increased reflex activity
d. Delayed sense perception.

In Hypogonadism there may be

a. Emotional instability and irritability
b. Low intelligence.

In Hyperparathyroidism there may be

a. Lack of interest in surroundings.

In Hypoparthyroidism there may be

a. Anxiety states
b. Overexcitability
c. Mental acuity and hyperactivity of senses
d. Impairment of memory
e. Exaggerated reflexes.

In Adrenal Insufficiency there may be

a. Apathy and lassitude.

In Thymic Hypertrophy there may be

a. Mental deficiency.

In Pineal Tumors there may be

a. Mental precocity.

The above outline illustrates the profound influence of the endocrine system on personality traits and on the mental processes, which to a large degree determine learning ability. Conversely, we have evidence of the direct influence of the emotions in suppressing or altering physiological functions. We are accustomed to refer to the emotions as residing in the heart. This is merely a fanciful figure of speech. The scientific fact is that the emotions, if they reside at all, reside in, or more correctly, preside over the viscera, the gastro-intestinal system,

and the brain. Ample evidence has been produced to show that worry, anxiety, fear, fright, the major effective states, cause varying degrees of arrestment of gastro-intestinal action such as failure to secrete hydrochloric-acid and digestive enzymes, retention of undigested food for hours, gastritis, colitis, ulcers, diarrhea, constipation. Allergies, respiratory conditions such as asthma, cardiovascular conditions such as fluctuation of blood pressure, changes of pulse rate, and many other disorders, are frequently the result of emotional states.

This brief review of the functions of the most important nutrients should be sufficient to convince us of the vital importance of insuring that our diets are supplied adequately with these essential nutrients.

If diets could be left to chance and everyone could be trusted to choose and eat the right foods in the right amounts, and if our digestion, assimilation, and metabolism were normal, our interest in nutrition would be largely academic.

The problem, however, ceases to be academic and becomes of vital practical importance when it is realized that it is now proven beyond a shadow of a doubt that dietary deficiencies are widespread, not only in America but throughout the whole civilized world. Dietary deficiencies are made possible by the following conditions:

1. Human beings cannot be trusted to leave their diets either to chance or to self choice. A diet freely chosen according to the individual's whims, likes, dislikes, and appetite will in 99 cases out of 100 be deficient or unbalanced in one or more of a great variety of ways.

2. The trend of modern civilization has brought about profound and detrimental changes in the processing and properties of food stuffs. A great many of the foods of today (notwithstanding the so-called advances of science) are actually of inferior quality and contain less nutrients than they formerly contained.

3. Due to the rapid mechanization of our age, there has been a tremendous lessening in physical activity among the greater part of the population, resulting not only in a greatly decreased per capita consumption of food, but also in a greatly diminished intake of the oxygen which is so vitally necessary to convert our food into energy and tissue.

4. Due to our failure to give the problem adequate consideration, there has been a gradual and serious depletion of minerals in our soils. The foods grown and the animals raised on these soils are correspondingly deficient.

This combination of haphazard diets, inferior foods, reduced food intake, reduced oxygen intake, and deficient soils, without any attempt on our part to adjust ourselves to changed and changing conditions has resulted in a wide prevalence of deficient and unbalanced diets resulting in and accompanied by endocrine and metabolic disturbances.

By means of the technique of Diet Analysis, dietary deficiencies and imbalances can be revealed quantitatively in any given diet. Diet analyses among a cross section of over 2,000 cases from every walk of life in southern California have revealed the following common dietary deficiencies:

a. Deficiencies and imbalances of proteins, fats, and carbohydrates.
b. Deficiencies and imbalances of minerals.
c. Deficiencies of vitamins.

All or several of the above deficiencies may occur in the same diet.

a. Energy Foods: It is common to find deficiencies of total energy foods with a deficiency of proteins being pronounced, frequently accompanied by a disproportionate excess of carbohydrate foods derived from grains, cereals, and refined carbohydrates, e.e., carbohydrates derived from foods other than fruits, vegetables, and milk. A deficiency of total calories is much more frequent than an excess.

b. Mineral Deficiencies and Imbalances: Common mineral deficiencies are: deficiencies of calcium and phosphorus usually accompanied by an undesirable ratio of calcium to phosphorus. Deficiency of iron; a deficiency of iodine is also common. In this connection, it is well to remember that while a diet may be abundantly supplied with calcium and phosphorus, faulty calcium metabolism is likely to result if other minerals such as iron, iodine, and vitamins are deficient.

c. Vitamin Deficiencies: Common deficiencies are Vitamin D -- most pronounced and most frequent. -- Vitamin B_1, Vitamin A, Vitamin C, Vitamin G is seldom deficient to a serious extent, except where the total calorie intake is low.

Disturbances of Metabolism

Deficiencies in the diet are invariably accompanied by disturbances of metabolism resulting in:

a. Failure to manufacture hemoglobin and red cells.
b. Failure in assimilation and calcification of Calcium and Phosphorus.
c. Failure or malfunction of one or more of the endocrine system, principally the thyroid, pituitary, gonads, and pancreas.

Now let us look into some of the implications behind dietary deficiencies. For the sake of brevity we shall confine our attention to a few of the major deficiencies. The outstanding deficiency of energy foods is deficiency of protein which is also vitally essential for tissue building. The average diet in southern California is more than 50% deficient in protein content. Usually when the diet is deficient in protein, what little protein it contains is generally of poor biological value. The outstanding implications underlying this deficiency of protein are: lack of energy and lack of raw materials to manufacture tissues. The striking

manifestations of poor tissue manufacture are malfunction or hypo-function of one or more of the endocrine system; the members most frequently involved being the thyroid, pituitary, the gonads and pancreas.

The outstanding deficiencies of minerals are deficiencies of Iodine, Calcium, and Iron. The average diet contains less than 20% of the optimum amount of Iodine, less than 50% of its optimum amount of calcium, and less than 75% of its optimum amount of Iron.

The outstanding deficiencies of vitamins are deficiencies of vitamins B_1 and D, and A, with minor deficiencies of C and B_2 (G). The average diet in southern California contains less than 30% of its optimum amounts of Vitamin B_1 , less than 10% of optimum amounts of Vitamin D, and less than 60% of optimum amounts of Vitamin A. If we refer back to the functions of Protein, minerals, and vitamins, we realize the serious implications underlying these deficiencies.

These dietary deficiencies are responsible for:

a. An organism below par in energy and vitality. This factor has a a profound bearing upon learning ability of every description. One of the anomalies of modern living is the universal condition of tiredness, lack of energy, pep, etc. With all our labor-saving devices, lack of physical activity, etc., we should actually have more available energy for mental activity. On the contrary, people have less energy now than formerly. There is a logical nutritional explanation of the anomaly which need not be amplified here.

b. Malfunction or hypo-function of one or more of the endocrine system -- the members most frequently involved being the thyroid, pituitary, and gonads. I do not refer now to gross malfunction of the circus freak variety. I refer to border-line and mild type of malfunction not readily detected. The seriousness of this condition may be judged from the statement that diet surveys among women in southern California reveal an incidence of low basal metabolism as high as one out of three.

c. An organism with poor coordination and control of nerve and muscle excitability. This condition is saddling us with a large proportion of the population, both young as well as middle aged, excitable, unbalanced, maladjusted, jittery, and inattentive, unable to concentrate.

d. An organism with a low factor of resistance to environmental stresses and strains, etc. We see this condition reflected in the young as well as in older groups. It manifests itself as "inability to take punishment," "lack of intestinal fortitude", etc.

e. An organism with a low factor of resistance to invasion by pathogenic bacteria. This manifests itself more particularly in evidence of lowered resistance to the viruses such as those responsible for the common cold, flu, etc.

f. An organism with a low fertility factor and low capacity for reproduction. The decline in the rate of accrual of population is not entirely due to self imposed restrictions on the size of the family. Clinicians report that sterility is increasing in incidence.

g. An organism with increased susceptibility to the degenerative diseases. While the number of deaths from infectious diseases has decreased, the death rate from degenerative diseases has increased to an alarming extent. Since 1907, the beginning of the machine age, the mortality due to heart disease has increased 60% while the incidence of cancer has arisen over 50%.

The serious aspects of these deficiencies are:

1. They are not confined to some under-privileged or submerged class but they are widespread among the population regardless of economic or income level.

2. They represent a picture of preclinical and subclinical conditions of which the medical profession is either not conscious at all, or only vaguely aware. In fact, the only individuals who have a clear perspective of this picture are a comparatively few isolated nutritionists, physicians, and dentists. Until very recently the conditions of which I speak were not detectable by conventional clinical techniques so that we had no criteria by which to evaluate the implications referred to above. It is only since the application of the newer nutritional techniques that we have been able to appraise dietary and nutritional deficiencies.

With this picture as a background it is safe to say that if we could devise a scale of measurement to evaluate the efficiency of our learning ability we should find the co-efficient either very low or at least capable of much improvement. If we take the necessary steps to correct dietary deficiencies we should be able to predict the efficiency of learning ability to improve or rise. This idea presents a fascinating range of research projects which if ever completed and applied through our population as a whole, will have far reaching potentialities for increased human happiness and well-being.

In my own limited way, for the past three years, I have endeavored to explore the possibilities in this field. Up to the present I have been searching and endeavoring to devise techniques and criteria for the quantitative and objective measurement of improved learning ability and mental efficiency in relation to nutritional status.

The subjective evidence of improvement is impressive but of little scientific value. Students and teachers report improved well being, increased vitality, better poise, improved emotional status, fewer colds, etc.,

The only objective quantitative proof obtained to date consists of records of improved school attendance, decreased occupancy of dormitory

sick bays, improved blood counts, etc. Attempts to evaluate improved mental ratings and grade point averages are inconclusive on account of so many uncontrollable factors. Nevertheless, the indications obtained would seem to justify a long range comprehensive study on this important phase.

The foregoing account is of necessity a brief sketchy abstract with all the limitations and inaccuracies usually attending such processes. I shall have fulfilled a useful function if my efforts are effective in convincing you that there is an important relationship between nutrition and learning ability. If I succeed in leaving you with that conviction, then you should act upon it. Take up the study of nutrition and apply the knowledge thus gained to your own lives as well as those of your students.

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THE DOCTOR LOOKS AT READING

John C. Wilcox, M.D., Pediatric Physician, Pomona

Paraphrasing "The Doctor Looks at Love and Life", this presentation might be called "The Pediatrician Looks at Reading". I plan to exhibit a concept of Reading based upon a pediatric impression of the child's development before giving brief consideration to the factors which influence his ability to learn to read.

Reading is said to be a process of discriminative reaction behavior. So also is the process by which the trained mouse progresses through a maze to reach the cheese. So also is the process by which the wise trout selects the genuine fly and lives, while his junior bites on a Scarlet Coachman and is fried for supper. We need to go further into this definition. Reading is not only just a discriminative behavior, it is one of the most universally desirable discriminative behavior reactions. It is the most important discriminative behavior which is taught in the early school grades, and more than any other skill, colors and modifies all subsequently developed discriminative abilities.

I believe it is pertinent and helpful to think of ordinary reading as a major manifestation of underlying ability in discrimination. Efficient rapid reading may be thought of as the ultimate climactic quintescence of the fully developed power of visual discrimination.

I have heard from Mrs. Wilcox that "Reading" has two rather widely divergent definitions in educational circles. (1) "Reading is the entire process of making discriminating reactions." This is an all-inclusive definition and by it reading is said to include processes of discrimination such as the astrologer's differentiatiom between those born under the sign of Gemini and those of Leo or Aquarius; also the process through which the murderer decides between the relative merits of a clean shot into the head or a knife in the back. But you are primarily interested in discriminatory reaction which can be applied to the school teaching problem, so for the purposes of this discussion I plan to limit the definition to: (2) Reading is the <u>visual discriminatory reaction behavior determined by the mental interpretation of language through the medium of printed symbols.</u>

Let us consider this matter of discriminatory behavior. Certain facts are basically true:

(1). <u>It is a natural pre-natally acquired human endowment</u>.

Even a newborn infant has discriminatory ability, and can tell light from dark. Beyond this he has no power of discrimination in a visual sense. He can tell pain from the absence of it, but this is a rather gross discrimination and he probably is unable to appreciate the location of his pain. Although his sense of touch is very acute about his lips, he makes no discrimination as to what touches him there; he will suck anything. He

recognizes the difference between loud sound and quiet, but that sound is no more than a noise to him.

In position sense, he recognizes the difference between lying still, supported, and falling through space. In short, his world is made of lightness and darkness, sound and quiet, body support and lack of it, comfort and pain, something to suck on and nothing.

This knowledge he possesses is small, but it is real, and it is one thing we can point to and say with justification that he is better than an amoeba. It has an inherent proclivity for growth.

(2) <u>It grows with the individual, progressively and without stimulation other than normal environment</u>.

Take this baby we have just seen born -- feed him and keep him healthy, and you will observe a marvelous blossoming of his crude discriminatory ability into something by which he controls his very existence and even his environment. Its ramifications and departments will become innumerable. All this will happen if you give him care and sit and wait, and <u>if</u> no disturbing factors appear:

(3) <u>This development proceeds hand in hand with general nervous system growth</u>; it is largely dependent upon and proportional to general nervous-system growth, and therefore the ultimate level of discriminatory power at which a given individual may arrive will depend upon the general level of central nervous-system development attained by that individual. Quite rightly you will not expect the classroom dullards with their I.Q.s of 50 to learn to discriminate, visually or any other way, as well as the group of I.Q's 130-140. Do not jump to the conclusion, however, that reading is an exercise in discriminatory ability and should be an easy and natural accomplishment of the child with the higher grade of mental development as evidenced by the I. Q.

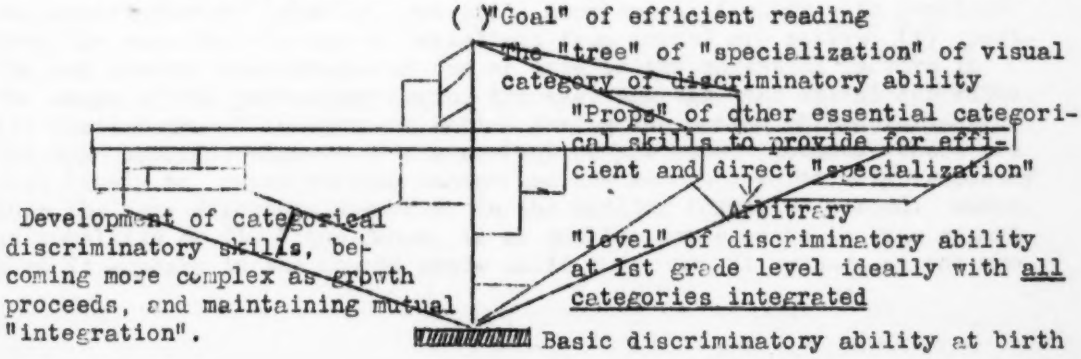
(4) <u>Its growth proceeds in several parallel paths of concept, which maintain a mutual integration in order to arrive at an eventual mutual goal of efficiency</u>. That is to say, in the hypothetical normal individual, uninfluenced by specific training or deleterious influence, the specific categories (visual, auditory, tactile, dextralization, abstract ideology, etc.) develop in definite time and relative efficiency ratios with each other. There is a pattern of growth which dictates to each categorical part the place it must take at each stage of the general growth. This we know as "integration". It is not simply an accident that the infant learns to recognize that his mother's face is different from others at about the age of two months; at about the same time he learns to recognize her voice; and together these two discriminative abilities allow him to appreciate that mother means food or the re-establishment of comfort. Neither is it accidental that the normal child is not able to read before five or six years of age; it has not been long since that he has learned the difference between a triangle, a diamond, a square -- to the extent that he has not only seen the difference, but has also integrated the difference firmly into his consciousness by demonstrating an ability to

re-create the difference by drawing, and further to integrate this knowledge by showing ability to re-create the image and express that creation through speech. In other words, his general discriminatory ability is not adequately complete until each of the several categorical parts are both individually developed and mutually integrated.

(5) It is possible, and often necessary, to specialize in one category or another of the developing of discriminatory consciousness. A blind man must specialize in the tacticle category in order to have knowledge of the things the rest of us see. The efficiency of touch he thereby gains is far above "normal". A tea-taster must specialize in the taste category. Any such specialization is analogous to specialization in any medical branch; a doctor does not become an oculist, or an orthopedist, or a pediatrician, unless he first has the requisite general medical and surgical training upon which he stands while becoming trained for the specialist's occupation. In the same way, one cannot specialize in any category of discriminative behavior until he has a solid background of the requisite general ability in discriminative behavior, with all the related categorical parts in complete integration. The analogy with medical training is not exactly accurate in one respect: in medicine the general knowledge is obtained through schooling; in our topic of discriminative behavior the general development and orientation is normally and usually obtained without effort on the part of the individual and without specific training.

The ability to read (as we have defined reading), must be considered a specialization in visual discriminatory reaction. The normal child at an appropriate age arrives where he has at his disposal a general ability composed of integrated discriminatory skills, and at that point he is ready to embark upon the venture of specialization. If he were never asked to specialize in the differentiation of symbol forms, obviously he never would learn to read, and what is more significant, his concept of symbol forms would remain infantile. Show an Australian bushman a picture postal card and it is said he will look at it upside down just as willingly as right side up; he has not been called upon in his simple life to interpret symbol forms and does not recognize that this form represents a tree, that one a cloud, -- and yet his specialization in discriminatory arm muscle behavior permits him to throw a boomerang far better than any of us.

What has been presented thus far may be represented diagramatically:



Our purpose in the pre-school developmental years, then, is to provide the youngster with environment and experience which will enhance and encourage this integrated level. The reason we do not allow him to read until it is established is that we do not wish any prop to be lacking at the start and thus allow the "tree" to grow slant-wise and be deviated from direct progress to the goal of reading.

To this end, we are interested in two things: (1) what will help us, and (2) what will hinder us.

What will help us? Briefly, all those things which are done in the well-rounded nursery school program. I need not enlarge upon this. These activities are designed to promote neuro-muscular and cerebral integration.

What will hinder us? Any deviation from "normal" by which individual category development is impeded, or which impedes cerebral integration. Under the first of these sub-headings we include all abnormalities of eye function, ear function, speech function..

Under the second we include the contagious diseases (such as measles) endocrine imbalances (such as thyroid deficiency), metabolic disorders (such as diabetes or allergy), specific nervous or mental disorders (such as chorea or epilepsy), and social and psychological maladjustments.

The disturbances and significance of these latter conditions are too little appreciated. Too often parents or teachers complain that there is absolutely no reason for this first or second grade child not being able to learn to read as well as his fellows: his eyes and ears and language ability and his intelligence have been found to be perfect, or even superior. The most interesting commentary upon this is the frequency with which certain contagious diseases -- whooping cough, measles, chicken pox, mumps -- all of which we recognize as having particular affinity for central nervous system tissue,-- are found to have occurred in these disturbed children. Last year at one of these meetings Dr. Pottenger discussed the frequency of allergic and endocrine imbalance among them ... I should like to propose that the difficulty caused in these instances is failure of proper integration, a failure in development of the basic pattern of discriminatory behavior.

What about the child who has developed a good foundation in general discriminatory behavior, yet still develops difficulty with reading? Here the same two classes of deviations from normal are active: (1) specific and active disturbance of one or more of the essential factors in the shape of its particular organ, the eye, the ear, the speech apparatus. (2) disturbance of integration active during the period of specialization. The same specific classes of disease may be put here. However, these are less likely to cause serious damage and are more apt to be only temporary than the same disorders occurring in the earlier formative period. Mumps, encephalitis or St. Vitus dance, is of smaller consequence in this regard when it appears in the fourth grade child than when it appears at the age

of three or four years.

So we have, among children experiencing reading difficulties, four general classes:

(1) Specific organ defect before the establishment of the integrated basic discriminatory ability.

(2) Generally expressed deviation from normal before the establishment of the integrated basic discriminatory ability. These two result in inadequate integration of the general discriminatory judgment and thus, inadequate preparation for specialization.

(3) Specific organ defect appearing during the period of specialization.

(4) Generally expressed deviation from normal during the period of specialization . These result in impeded progress of "specialization".

When confronted with any problem of the teaching of reading to a child, it is essential that you first establish into what group he belongs. An axiom in the practice of medicine is "Look for the easy things first". Apply this to your problem and you will be forced into a routine like this:

(1) Physical examination to determine presence of active general metabolic, allergic, endocrine, or infectuous disease.

(2) Specific examination of the essential discriminatory skills of visual acuity, visual imagery, convergence, and fusion, adequacy of functioning binocular vision, hearing,and destralization.

(3) Investigation of the pre-school history for evidences of the previous existence of the afore-mentioned deviations from normal.

The treatment of any given case will be dictated, automatically, when the proper group assignment has been made. For example, if the subject falls into Group III with the only defect discovered an actively present motor incoordination of the eye muscles, the chief part of the treatment is going to be along the lines of exercise in ocular muscle coordination by means of the metronoscope, or possibly the use of the optometrist's or oculist's armamentaria of machines, or more simple classroom or home exercises. If the subject falls into Group II with a defect based upon a primarily inadequate integration of the basic discriminatory skills, resultant from severe whooping cough at the age of two years, or because of uncontrolled allergy from two to four years, then the emphasis of the treatment will be upon procedures designed to integrate these essential related skills. This will not include any teaching of reading per se.

I do not know that Dr. Fernald would agree with me in this, but pro-

bably what she does when she puts a child through the mill of tracing and re-tracing over and over again, a word, is to force that child into a pattern of neuromuscular integration. She herself makes particular comment on the fact that once her subjects have learned a few words in this manner, then reading as we know it, becomes easy for them. It probably is fallacious to assume that all reading problem children should be subjected to this forcing procedure - there are many other ways more personally suited to the problem of inadequate integration in particular children.

I was asked by Dr. Spencer whether or not treatment for specific reading difficulties should take the place of the reading program during the corrective period. In the light of what I have now said, this must be answered by saying that it depends upon the group to which the particular case belongs. Some reading difficulty problems should be anticipated and corrected before any reading at all is done. In others, intensive reading may in itself be a large part of the treatment.

In conclusion, it seems to me that the essential facts to remember when considering any reading difficulty are:

(1) Reading, as we commonly define it, is the result of intensive specialization of visual discriminatory behavior, based upon the solid footing of a general ability in discriminatory behavior as a whole, which is not possible without adequate individual development and mutual integration of several discriminatory skills.

(2) Defects or diseases during the period of pre-school nervous development may prevent the development of integration at the expected age. If specialization is attempted before the "solid footing" of basic knowledge is complete, difficulty may be expected.

(3) Correction of any reading problem cannot proceed until, by careful analysis, it is allocated to its proper group as determined in the light of the concept I have presented. The advisable emphasis of treatment is automatically established when the analysis is concluded.

SEMANTIC ASPECTS OF VOCATIONAL ADJUSTMENT

Frances Farmer Wilder, Director of Education
Pacific Network, Columbia Broadcasting System, Inc.

This title assumes that semantic aspects, which roughly refer to language predicaments, have something to do with vocational problems and that vocational problems concern many of us. The kind of semantics talked about in this paper are the methods used in the General Semantics of Alfred Korzybski as treated in "Science and Sanity". As I interpret it, this system of thought applies the methods of science to thinking processes. It would apply the principles of better ordering to human and social problems.

As we look at the world as we know it, it seems evident that the scientific method has made marvelous releases in its field. In mathematics, in physics, in chemistry, in biology the discoveries have completely changed the world of our grandfathers into the world in which we live.

Most noted educators talk about "cultural lag", or about "ideology not keeping up with technology", or simply, about our thinking not being adjusted to the tools with which we control our environment.

General Semantics goes on the hypothesis that the same method used in scientific research applied to our ideology would work similar miraculous releases. Now let's consider some phases of this modern scientific method. Oversimplified, it results in the following processes:

1. Gathering available facts.
2. Arranging the facts. (ordering them)
3. Evaluating the facts (allowing for facts unknown)

I shall give you, first, a few general notions of how this <u>modern</u> scientific method works; second, some examples of applying language to facts; third, emphasize particularly how fears which run through so much of our commercial livelihood adjustments can be considerably lessened.

These methods applied to <u>thinking</u> by the average person would clarify confusion, release ideas, motivate activity, and contribute to balanced thinking. This matter of balanced thinking has to do with relationships. A man in a laboratory is faced with an indefinite amount of data. To consummate a conclusion in any research, to make a workable formula, requires proper relationships between factors. Water comes from relating of two atoms of hydrogen to one atom of oxygen. An airplane results from the relation of power to the machine to the air (this is oversimplified, of course), and in human beings this scientific relating of definite factors is a matter of balanced thinking.

I have here two newspaper clippings. One of them says, "Methods of Science Applied to Pasadena Traffic, Cuts Accidents from 1936 to 1940 in

Half", and it goes on to explain that they took a scientist from Cal Tech to look at the facts about traffic accidents in Pasadena. There was a high percentage of accidents at certain hours at specified places at high rates of speed. They observed the fact that a traffic officer cruising the highway will keep ten cars from speeding, instead of the one car he may stop if he hides in the bushes behind the corner. So, in evaluating these facts, they decided to have cruising traffic officers supervise, at certain times, at specified places, with the results as I have told you.

Another clipping from the Reader's Digest: A city in the Northwest discovers that the majority of students getting out of school have no specific ideas of what to do or how to do it. So the three service clubs of the city organized what they called a "Dutch Uncle Club", and they as business men arranged to talk individually or in groups to all the youth of the city, giving them facts about business practices, needs, job opportunities. Does this sound like common sense to you, or better perhaps, uncommon sense, which is Korzybski's term? And have you read in the papers of the strikes that have been settled by the governor of a state who insisted that both sides get together and look at all significant available facts?

And how do we as people look at world facts? Is Hitler completely inhumanitarian, or are there some things to be admired in his regime? Is England degenerate as exemplified by some of the activities of the ruling class, notably a king's abdication, or have they stood for individual freedom for 600 years? Is Japan going to help China make an adjustment to a modern world, or will its regime be one of ruthless subjection? And in the National scene: Is the Democratic Party the only organization to guide us at the present time, or is the Republican Party the only group with capabilities to direct our national life? And I can ask you questions like this about your state, your city, your schools, and your family. You may wonder what this has to do with vocational adjustment, and I will say that your method of thinking about these problems permeates the thinking of all your activities. Do you look at available facts and balance them, or do you, in advance, assume that a thing is either good or bad, and fit the facts to your feelings?

In looking at man scientifically, it becomes evident that communication is of paramount importance. Language is essential in any human adjustment. Language from a scientific point of view becomes one of the principal concerns of General Semantics. Language can be used as a map - an accurate map giving verifiable reports - this is how science uses it. Suppose you had a map marked San Francisco where Chicago should be, or vice versa, you would have a difficult time finding your way around. Does it seem probable that a language structurally different from the physical world in which it is used might lead to confusion? Let's see.

As I have already said, the world today is a changed world-changed by scientific knowledge. And the language? The structure of our language

dates back 2000 years. It is no longer an accurate map for communication. For instance, take the terms Mind and Body. We have gone for 2000 years and longer talking of those two concepts as if they are individual entities. Modern science and research have brought proof that these two concepts won't divide. A mind has not existed without a body and a body without a mind does not function as a human being. To be an accurate map, that expression should be Mind-Body. This applies to intellect-emotion. Is it a new concept to you that you do not think without your thinking being influenced by your emotions, or that your feelings are influenced by your mind?

Well, let me give you another idea here before I point this up with any general conclusions. From scientific observation, General Semantics comes to another conclusion - that the word is not the thing. For instance, the word "chair" is not that physical event so labelled. We have many words that refer to things fabricated inside our heads, such as honor, glory, etc. We are frequently confusing the projection of such fabrications inside our heads on the outside world. Take, for example, the woman who says, "Mr. S. insulted me." This word "insult" projects the woman's reaction. If we examine the facts, Mr. S. disagreed with something the woman wanted to do. From the firmness in tone (he happened to be her lawyer) and the brevity with which he spoke, she inferred an insult and so she projected her reaction as a fact, which it may not have been.

Let me give you another example of where the word is not the thing. You are travelling along the highway - you have a flat tire - it is hot and dusty. A ragged youngster from the neighboring farm crawls from under the fence and calls, "Got a flat tire, Mister". And if you take the words at their face value and say, "What the deuce does it look like", you will have affronted a human being. Whereas if you go to the meaning behind the words and say, "Yep, sonny, I guess I have a job on my hands",he will soon be handing you tools to help you in your work, and you will have made a friend. If you get annoyed by all the conversation that goes on daily about the weather, then you do not realize that the word is not the thing and that the weather has nothing to do with this conversation in its essence - it is merely the friendliness of human beings trying to find expression. In marital quarrels when a wife calls her husband harsh names, if he understood that what she is really saying is probably, "Darling, I am hurt - can't you explain the meaning of this", many quarrels would be averted. Or this might be vice versa.

I had a case in my office the other day: One of the boys was late for work, and when he came up to the desk the man in charge said, "Look, your're five minutes late", and the boy's reply was belligerently, "So what- what difference does it make." Now, this is in connection with tours that have to start on time, and knowing the boy who made the remark I was sure that what he meant to say was, "Gee, I'm sorry - I will try not to be late again." But in his embarrassment in being in the wrong, his use of words was unfortunate.

Now, let us look at vocational adjustment in terms of these two factors:

a. Looking at, and relating facts
b. Using the language as an accurate map

Let's start at the beginning with the business of getting a job. Ninety per cent of the young people who come to me say, "I want to work". Now in 1900 when there weren't ten million unemployed, the desire to work had some relationship to getting a job. Today it hasn't. Again the phrase "I'll do anything" bears little relation to industry's need of employment, as does the statement, "I am about to lose my home- my wife is ill and I must have work". The individual in looking for a job must look first at these sets of facts: What can I do? Where can my aptitudes be applied in the business world? Industry pays for skills and labor. What skills and labor have I to offer industry?

These are the facts that have a relationship to the business of getting a job. And in the business of getting a job and in keeping a job, ideas are vitally important, and again, ideas are merely a matter of structural relationships. Although there is "nothing new under the sun", there is an indefinite variety of relationships in these old things. For instance, a boy came to me with an idea about a tie-up between motion pictures and radio. Now that particular idea was not workable, but the fact that this youngster, though inexperienced, could figure out new relationships, made me hire him because, with experience, he would figure out workable relationships, and the person with ideas in the job will probably be the one to progress.

Now let us look at the job itself. What are some of the essential factors for doing a job well? What are the aptitudes, physical and mental? Is a girl deft with her hands? Is her eye quick? Then can she be a good typist? Has a man a good voice? Has he good diction? Does he work quickly in emergencies? Then can he be an announcer? And when they have the job, what are their relationships within the organization? How has their "social behavior" been developed? Do they recognize the structural pattern of executive, equals, and lesser employees? This matter of relationships is very important. Women, for instance, are frequently handicapped in business by their attitude toward the "boss". In their mind, the "boss" is identified with the concept "stern father", or identified with the husband-who-holds-the-purse-strings, or with the "strict teacher". It's a very successful woman who evaluates a superior as a co-worker. It's important for a junior employee to have a proper concept of his relation with the superior so that he isn't either fawning or presumptious. And the attitude of the executive toward the people who work under him makes for loyalty and pleasant work, or for fear and work that is not a satisfactory expression. From experience I know that calling attention to these relationships and explaining them, helps in personnel adjustment.

All right, let us assume that we have a young man in a job. He has

aptitudes both mental and physical for that job. He has established his relationships with the rest of the organization. The organization is a progressive one, and he assumes if he works and has ideas, he will rise. All of these conditions being facts, he can predict with a fair degree of accuracy that his assumptions will develop into facts. Let me digress here a moment about predictability. You'll admit, I believe, that predictability in human affairs (and I don't mean the predictability of astrologers and palmists, rather, reasonable predictability) should be an advantage. One has that in science. Bridges built mathematically by the scientific method don't collapse, but social institutions built on sentimentality or on non-factual assumptions frequently collapse. General Semantics strives for predictability in human affairs by applying scientific methods.

But to go back to the main point of the person in the job. There are a number of problems for adjustment. To name only a few, there is the one of being constantly treated unjustly, there is the one of fear as an impetus to work, and there is the so-called "power complex". And let's consider the problem of immaturity - that child-like behavior which is frequently charming socially, but which crumples under stress. I have in mind a boy who got frightfully depressed because he wasn't advancing fast enough - another who got very angry over some trifle - and one who was impatient that his capabilities weren't readily recognized. All of these hindrances haven't been eradicated entirely, but at least the young men have a sense of humor about them now, so that they aren't the vital personal upsetting concepts that they were formerly; and this is what we did about them. We took getting angry, for instance. We gave the young man a little lesson in physiology as to how the nervous system works- as to how man's nervous system differs from animals - how man is capable of delayed reactions to stimuli. If you kick a dog he reacts instantly. If a catastrophe happens to man - if he is well balanced and mature, he need not react instantly - he may delay his reaction until he can think the situation over. You have heard the expressions "Seeing red", which is an instantaneous reaction, or the expression "Keeping your head" which is a delayed reaction. When we let ourselves "See Red" we are copying animals. And you know that in a fight you are more apt to win if you keep your head than if you "See Red". The old admonition of "counting ten before you speak" when you are angry, is based on the value of delayed reaction. With this information brought to his attention about anger, the young man of whom I speak no longer gets "fighting mad" but gets humorously irritated, which is a step in the right direction toward adjustment in an organization.

About the depression at not getting ahead - we called to mind his age (22). We had him estimate the ages of other people in the organization. We had him inquire into the numbers of years' training and experience those around him had had. We had him use words for their fact - not their fictional value. By looking at those facts and relating them to himself, he was able to see that his depressions were without foundation. And don't let me give you the idea that he is never depressed -he still is -

but he can look at it now and evaluate it, and come out of it.

Now for the impatience at lack of recognition. By questioning we discovered that he was an only child. We brought to his attention the fact that frequently an only child is given an undue sense of importance by his family. Often he lacks the discipline applied by brothers and sisters which can dispel that over-weening sense of importance. He has to recognize that the world in general is different from his mother and father to whom he was all-important. He has to evaluate his capabilities in comparison with the hundreds of other capable people with whom he comes in contact. You see, what we attempt to do is constantly to look at facts and evaluate those facts.

Now the second example I gave was that of a sense of persecution. I remember one example that was brought to my attention at the Western Electric plant in Chicago. A man came to the interviewer and wanted to be transferred to another department because the foreman "picked" on him. The interviewer brought out the facts merely by questioning the man. "How does the foreman pick on you." "Well, he yells at me." "Does he ever yell at anybody else?" "Yes." "Who?" "Well, sometimes he yells at the machinist next to me." "Did he ever yell at anybody else?" "Yes." Well, it finally developed that the foreman yelled at everybody, and the man himself was able to see that he wasn't being "picked" on especially, but that he merely worked under a man that yelled at people, and after coming to the conclusion that everybody else was yelled at too, he didn't seem to mind. He lost his sense of persecution. I suppose that in every department store, in every school, or in any phase of industry, you will find the person who feels persecuted, and frequently by looking at the facts and evaluating them that sense of persecution is dispelled.

Then, of course, there is another idea that makes for mal-adjustment in jobs, and that is the "power complex" which you find on the part of petty executives, and sometimes higher up executives, and because they <u>are</u> executives it is not so easy to advise them on their adjustment, as to advise the younger employees in the staff. But when one can show them that petty domination and injustice does not make for lasting morale, they may change their tactics. However, a great many employers feel that fear is an impetus toward making people work. You hear discussions daily about Germany. Some people are saying that it is the Gestapo that makes the German people work. I suggest that the findings of the eminent French biologist, Islanski, are nearer facts. From his research he presents the fact that the will to live is a primary reflex-action, and that an <u>aim</u>-to-live-for is a second primary reflex-action. He maintains that Hitler has utilized this aim motive on the part of children, youth, and adults, in Germany to further his ends. Aims have to do with relationships. They relate persons to others in the group, to a participation with desirable goals. Please note this statement is no judgment. It has to do with analysing structure, as to how relational processes work. The most progressive industries in the United States today are those which have attempted to remove fear from their employees - not only to remove fear but to put

in its place, aims.

Let me give you a little example of how giving an aim may work. One of our New York executives visited the Los Angeles organization. I asked him to speak to the junior staff. Now the junior staff consists of the younger members of the organization who are similar to apprentices. When this executive came in that morning and told the group of some five or six confidential objectives that the company was striving to attain (and he didn't do this abstractly, but point by point), every one who heard him went out with a feeling that he was a part of that organization, and that he was working toward that attainment.

Now that we have looked at a few of the notions as to how the modern scientific method works, and at some samples of applying language to facts, let's consider in detail the concept of fear. What has it to do with vocational adjustment? How does it operate? What can we do to lessen it?

Fear, we recognize, works as a basic animal reaction. How many of you, when a late comer enters the room, unconsciously look at that person? Biologists tell us that this is survival from animals in the forest sniffing the wind for an unfamiliar signal. Not all fears are damaging. If we are nearly struck by a motor car and fear inspires us to instant action for self-preservation, it's beneficial. But that is not a lasting fear, and that is not the one we will consider. You are undoubtedly familiar with the fear that may generate mob hysteria which becomes a kind of paralysis, or the fear that persists in over-anxiety and worry, which impedes the proper operations of human beings. What can we do about them?

What were the things that primitive men feared? The things they didn't understand - thunder and lightning, etc., and as our knowledge of the unknown has been acquired, our fears have diminished. What are the things that an infant fears? The new- the strange- and the unknown. And as soon as those things become familiar and old, and are understood, fear diminishes.

What about the man you know with a wife and two children who worries about what he would do if he lost his job? He worries, he doesn't sleep well, and his health is affected by the pressure of that fear. I reiterate that gathering and looking at significant available facts and evaluating them would lessen that fear. If he should lose his job, would he get unemployment insurance? Is there a possibility that he might get another job? Has he some capabilities in a field he hasn't yet tried that he might develop? Has he ever had ideas about other things in his own field he might do? Is there some special kind of service for which he has capabilities? Are there relatives who would help? Is there anything his wife could do in business? Could they sell their car and use that to keep them while he is looking for another job? Do they have to move to a smaller house, and would that be unbearable? It has happened many times that an individual who reduces his worry by this kind of mental

discipline increases his working capacity.

But in the final analysis, what about the fear of "relief"? Here is an example of how fear might be eradicated by proper linguistics. If "relief" means to the individual, dole- charity with its implications of failure- inadequacy- and a sense of being unneeded by society,- it's a "fearful" thing. If on the other hand that "relief" is "unemployment insurance"- a legitimate protection afforded the individual by society, which recognizes that its mechanism has not reached perfection- afforded the individual by taxes he has paid, the fear of "relief" can be tremendously lessened. If relief is expressed in terms of pensions, the legitimate reward accorded to persons who have long been useful in society, there is little place for the concept of fear.

If I make the statement that a great many fears come from fuzzy thinking, you may ask, "Is it delusional thinking that ten million people in the United States have no jobs?" "Isn't that a fact, and isn't it one to cause fear?"

It's a fact and if it causes the fear that results in defeatism, it is tragic, and if it's the fear that will stimulate us to action for self-preservation, we can solve the problem.

The problem is not entirely an individual one - it is a socio-economic one. Does it seem probable that there is a lack of engineering- a lack of planning- in ordering facts in our economic scheme of things - in our distribution system? Have you noticed the trend today toward planning? What about the new board appointed by the President? From a consideration of plans of armament, we can predict with a fair degree of certainty that general unemployment will be greatly lessened, and with this mechanism of organization put into operation it is possible that if we ever stop making armaments, we might be able to solve our unemployment situation. If we can have leadership not of one man nor of a small group of men, but leadership at every level- leadership to find a workable, that is, an engineering blue-print of our needs of production, our methods of production- the individual's place in that scheme, and with that leadership have the cooperation of everyone- then that fear-paralysis situation of job want, job lack, job insecurity, could be transformed into a unified drive to make the blueprint become a fact.

Please note how I have said this. Note the use of the conditional. Many of our verbal fictions come from assertion rather than from accurate tentative consideration. In proportion to more and more persons getting away from obsolete verbal fictions, i.e., world trade, outmoded policies, i.e. people work best under fear, fiction noises, i.e. bargain sales which are not bargains, and in proportion to more and more persons ordering their thinking away from over-emotionalism toward balanced intellect-emotion reaction, that is, toward accurate evaluations, in that proportion will we be released from fears, and when these things begin to happen on a large scale, sanity may be introduced into human affairs.

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